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ANTARCTIC NAMES

BY

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The South Polar regions, in respect to their nomenclature, are different from every other part of the world. As there are no inhabitants, there are no native names. All the names applied to all places beyond 60° S., have been given either by explorers or by stay-at-home geographers. While this nomenclature is in most cases satisfactory, it is, as yet, not entirely so. Some confusion has resulted from the natural tendency of each nationality of adopting the names given by its own explorers. Places have been named, then renamed, then perhaps renamed again. But although the Antarctic region is "No Man's Land" in International Law,* yet at present it is the stamping ground of explorers and scientists, and it would seem therefore as if scientific geographers had full sway and should crystallize Antarctic names in accordance with the claims of discovery.

A philosophic nomenclature of the Antarctic regions must, in the nature of things, be based on geographic and historic facts. Certain names may well be descriptive and others should be commemorative. This is tantamount to saying that Antarctic nomenclature must be founded on truth and justice, since geography and history are simply records of things as they are or of events which have

* Thomas Willing Balch: "The Arctic and Antarctic Regions and the Law of Nations": *The American Journal of International Law*, 1910. Thomas Baty: "Arctic and Antarctic Annexation": *Law Magazine and Review*, Vol. XXXVII, 1912, pp. 326–328.

XUM

happened. A proper Antarctic nomenclature must have its source in loyalty to humanity and to science, and not spring from servile obedience to national prejudices and national greed. The golden rule of doing unto others as you would like done unto yourself should ever be borne in mind, and international fair play should insist upon justice being awarded to all.

Since the Antarctic regions are "No Man's Land," and belong to the human race collectively, it seems self-evident that any names invented and applied to them as a whole, or used arbitrarily to designate large parts of them, whether as halves or quadrants or segments, or in any other divisions though convenient, should be international.

Smaller portions of the Antarctic regions, on the contrary, while politically "No Man's Land," historically belong to their discoverers. And from this fact springs automatically the correct local Antarctic nomenclature. Priority of discovery should be the guiding principle of the historical geographer. The claims of the explorers should be thought of first. The men who risked their lives and added to the sum of knowledge deserve to be commemorated by having their names attached to their discoveries. But often explorers have christened their discoveries by other names than their own, thus blotting out their most visible memorial to fame, and it is occasionally difficult to decide whether it is wisest to retain the name given by an explorer or to replace it by his own name. If the names of Antarctic voyagers, however, are applied to places within the Antarctic regions, they should always be applied to their own discoveries or at least confined to those parts where they have travelled, for it is historically confusing if they are connected with localities where the explorers themselves have not been. There are many crevasses in Antarctic nomenclature for historical geographers to fall into, but they can keep out of some of them by sticking to priority of discovery.

Next to the explorers themselves, the men who deserve to be commemorated are the men who supplied the funds. Financiers like Grinnell in the north, the Coats and Longstaff in the south, should never be forgotten. They handed out the cash to outfit expeditions, and their share was just as vital as that of the men who carried out those expeditions.

Confusion about names sometimes arises owing to different explorers having given different names to the same place. Confusion also results from the fact that in some cases names have been duplicated. Difficulties also sometimes occur because a wrong name or

a later name has become identified with a place. It is important for the sake of clearness that all such errors be corrected as soon as possible. Priority of discovery should be the guide. In the few instances of duplications of names in the Antarctic, the one last given should be changed. When different names have been given to the same place, the first appellation should have prior rights, and when a wrong name has become accepted through custom, it should be banished and a correct one substituted.

A rather curious phase of thought may be noticed in the fact that explorers, when giving names to new discoveries, seem to turn to the leading political, not scientific, personages, in their own land. In the Antarctic we find among others such names as Louis Philippe Land, King Edward VII Land, King Oscar II Land, South Victoria Land, Kaiser Wilhelm II Land, Fallières Land, etc. And why rulers should be honored in this way in the South Polar regions is hard to see. It would seem as though explorers would turn to the names of leading geographers and scientists of their own nation in preference, to men like Humboldt and Rennell and Reclus and Pasteur and Darwin: but for some mysterious reason they do not. The name of Dalrymple, so far as I know, does not appear on Antarctic charts, and yet it would seem as though he might have been commemorated by his own countrymen. Dr. W. S. Bruce* applied a somewhat drastic remedy to the overindulgence in royal names, by dropping Kings and Kaisers and shortening such names into Edward Land, Wilhelm Land, etc. The innovation seems one to be commended.

The striking example in Antarctic history of how names should be given is found in the nomenclature applied by Wilkes to consecutive parts of the great land he discovered. With the exception of Termination Land, a well found geographic name, all the names Wilkes applied to lands or islands, are commemorative of officers of his expedition. Knox, Budd, Totten, North, Carr, Alden, Case, Hudson, Reynolds, Eld, Ringgold, and also Piner, whose name was given to a bay, thanks to Wilkes' thoughtful and just tribute, will always remain associated with the great discovery in which they bore their share. Wilkes' modesty prevented him from attaching his own name to his discoveries, an omission which the sense of justice of historical geographers fortunately rectified.

In attempting to formulate a geographic and historic nomenclature for the Antarctic regions, one naturally begins with the names for the larger areas. It is known now that round the South Pole

* *Polar Exploration*, 1911.

there is one great mass of land covered with ice and snow, forming a vast frozen continent. A considerable area of this was known to the early American sealers, enough in fact for Edmund Fanning in 1833 to write twice of it as "the continent of Palmer's Land."* This appears to be the earliest recognition in print, based on actual knowledge, that there was an Antarctic land big enough in size to be considered as continental. No attention, however, was paid at the time to Fanning's remarks, which were indeed nearly forgotten until republished by the writer in 1902.† But as a question of nomenclature only, these statements of Fanning are also the earliest in which a definite name was applied to the then known mass of continental Antarctic land and the original name for the South Polar continent therefore was PALMER LAND. The lands in the Antarctic regions, however, whose discovery placed emphatically before the world the knowledge that there was a continent and not an ocean at the South Pole, were those discovered by Lieutenant Charles Wilkes, U. S. N. These lands were named by him The Antarctic Continent, and this name must, in the nature of things, always remain as one of the names of the entire landmass. A better name, however, because shorter, is the admirable one proposed by Sir John Murray, Antarctica, and wisely, this has been universally adopted. A better form for it perhaps would be its phonetic rendering, Antartika, but that is a minor detail, and, moreover, it is probably unattainable in English.

There have been several attempts made to find suitable names for the larger areas of Antarctica. The first probably was brought forward in 1899 by Sir Clements R. Markham, who suggested dividing the Antarctic into four quadrants‡ which he called respectively: from the Meridian of Greenwich to 90° W., the Weddell Quadrant; from 90° W. to 180°, the Ross Quadrant; from 180° to 90° E., the Victoria Quadrant; from 90° E. to the Meridian of Greenwich, the Enderby Quadrant. Dr. F. A. Cook§ suggested calling these quadrants the American Quadrant, the Pacific Quadrant, the Australian Quadrant, and the African Quadrant, each of them to be south of the respective continent or ocean after which it would be named. Another proposition of the same kind brought forward, I believe, by Mr. Henryk Arctowski, is to divide the Antarctic into three segments, and to call each segment after the ocean which faces it, the Atlantic, the Indian and the Pacific.

* *Voyages*, etc., pp. 103, 476. † *Antarctica*, p. 91. ‡ *The Geographical Journal*, 1899, pp. 473–481. § A. W. Greely: *Handbook of Polar Discoveries*, Boston, Little, Brown and Company, 1906, p. 277.

None of these propositions seems available. The nomenclature suggested by Sir Clements R. Markham is impossible, for the self-evident reason that it is national and not international. The names proposed by Dr. Cook and Mr. Arctowski, because they are international and because they locate geographically the position of the quadrant or segment, are much more appropriate than those advanced by Sir Clements R. Markham. Nevertheless the names suggested by Dr. Cook and Mr. Arctowski do not seem strictly practical. They are out of keeping with geographic nomenclature anywhere in the world. Men have always given names to large areas of land or water, and then have given names to portions of these areas; that is, geographic names always apply to definite localities. Thus we have America, North America, South America; and Africa, Central Africa, North Africa, East Africa, West Africa and South Africa. And we do not find such subdivisions for instance as Mediterranean Africa, Atlantic Africa, Indian Africa and Antarctic Africa, which would exactly correspond to the nomenclatures suggested for Antarctica by Dr. Cook and Mr. Arctowski. The fact that no such arrangement has ever been adopted in any corner of the world, shows that it is not a natural, that is, not a good one.

Another method of naming the larger areas of Antarctica springs from the fact that it is situated partly in the Western and partly in the Eastern hemispheres. The meridian of Greenwich and the 180th meridian bisect Antarctica into two rather unequal portions and it is a natural evolution to call these two parts West Antarctica and East Antarctica. The first proposition to this effect was made by the writer himself. While working over the records of Antarctic discovery, it soon became apparent that there was no name by which to refer collectively to the lands—the South Shetlands, the Powell Islands, Palmer Land, Graham Land, etc.—in the western Antarctic. One could not use constantly the cumbersome appellation "the lands south of South America." The writer thought a good deal about this and the solution finally came accidentally. In a letter of July 24, 1901, to the Paris *New York Herald,* which was published on July 27, 1901, the writer said "Nathaniel B. Palmer, of Stonington, Conn., discovered and first sailed along the northern coast of Western Antarctica." The name was found and the writer proposed in 1902* the names West Antarctica and East Antarctica for the western and eastern portions respectively of the Antarctic Continent. For, of course, if the name West Antarctica is applied to the lands in the

* *Antarctica*, 1902, pp. 12–13.

western hemisphere, the name East Antarctica must be applied to the lands in the eastern hemisphere.

These names were also invented independently by Dr. Otto Nordenskjold during the winters of 1902 and 1903 at Snow Hill on the coast of Nordenskjold Land.* He explained clearly his reasons for choosing these names. And here the writer would like to put on record his appreciation of the courtesy shown to him by Dr. Nordenskjold. Dr. Nordenskjold, than whom no one was ever fairer or more impartial, has, when discussing Antarctic nomenclature,† invariably referred to the writer's priority in the invention of the names West Antarctica and East Antarctica. In return, I wish to accentuate the fact that these names were thought out independently by Dr. Nordenskjold, and that his use of them has probably insured their universal adoption.

Further studies in Antarctic history and nomenclature, however, have led once more by evolution Dr. Nordenskjold and the writer in the same direction in a search for available names. The name West Antarctica described at first perfectly the land complex of the Shetlands, Powell Islands, Palmer Land, Graham Land, etc. Since the discovery of Edward Land and Coats Land, however, both of which belong to West Antarctica, it no longer does so sufficiently. There is need of a more specialized name. The writer has occasionally used for Palmer Land, Graham Land, etc., the appellation "Northern West Antarctica."‡ And Dr. Nordenskjold in his recent work suggests that a definite name be given to these lands and suggests "Nordöstlich West Antarctica" or for shortness "Nordwestantarctica."§ But is this terminology which once more suggested itself independently to Dr. Nordenskjold and myself the best? I think not. For if there is a Northern West Antarctica, there should be a Southern West Antarctica. And by analogy there ought to be a Northern East Antarctica and a Southern East Antarctica. And none of these three latter names is in anywise suitable. Yet some names are imperative, as anyone who attempts to write about Antarctic discovery will soon find out.

It would seem as if the solution consisted in carrying further the terminology in accordance with the hemispheres. Besides the divisions into halves, Antarctica might be divided into quarters. Here

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* *Antarctica or Two Years amongst the Ice of the South Pole*, 1905, pp. 68-69.

† *Antarctica or Two Years amongst the Ice of the South Pole*, p. 69. *The Geographical Journal*, 1911, Vol. XXXVIII, p. 287. *Die Schwedische Südpolar Expedition*, p. 64.

‡ *Bulletin American Geographical Society*, February, 1911, p. 87.

§ *Die Schwedische Südpolar Expedition*, p. 66.

we have the quadrant idea of Sir Clements R. Markham, in itself a good idea. If the hemispherical terminology be applied to this, West Antarctica would be divided into Eastern West Antarctica between 0° and 90° W., and Western West Antarctica between 90° W. and 180°: and East Antarctica would be divided into Eastern East Antarctica between 180° and 90° E., and Western East Antarctica between 90° E. and 0°. A small map inscribed with these names only is published with this article in order to present them more clearly. If a still more specialized name is deemed necessary for the peninsula from Palmer Land to Fallières Land inclusive, Northeastern West Antarctica, as suggested by Dr. Nordenskjold, would answer the need. It might also be possible, for everything south of 80°, to use the term Central Antarctica, which would be susceptible of division also into Central West Antarctica and Central East Antarctica. It would, however, be rather cumbersome to add these latter names. The division into quarters, with possibly the name suggested for the peninsula by Dr. Nordenskjold, ought to be amply sufficient for clearness. The greatest drawback to these names is their length, and this may militate against their adoption. It is questionable, however, if they could be shortened in English. It would seem impossible to abbreviate Eastern and Western into East and West without destroying the euphony of the names. Whether geographers will put the seal of approval on this suggested nomenclature will depend, of course, on how much they consider it necessary.

All other names in Antarctica, in my opinion, need to be local only, and as far as possible should commemorate the explorers themselves, or the men who made the expeditions possible. And, in applying names to local parts of Antarctica, it must be noted that Antarctica consists of a mainland and islands. It is necessary, for geographical clarity, that all coastal areas of the mainland should have special names. These should receive the additional surfix of "land." Dr. Nordenskjold has recently suggested* designating Antarctic coastal lands by the surfix "coast" instead of "land." I should deprecate such a change. The term "land" has been generally used in the polar regions to describe new landfalls. It is more descriptive and accurate than "coast," for it includes a certain amount of the *hinterland*. It seems to me the term "land" should be reserved for the mainland as opposed to "island": and when the insularity of any discovery is proved the term "land" can be changed into "island"

* *Die Schwedische Südpolar Expedition*, pp. 69–70.

almost automatically. The term "group" instead of "islands" must be used in two or three instances for special reasons. Archipelago is perhaps best avoided on account of its length. Any parts of the Great Ice Cap actually explored might well receive the surfix of "plateau."

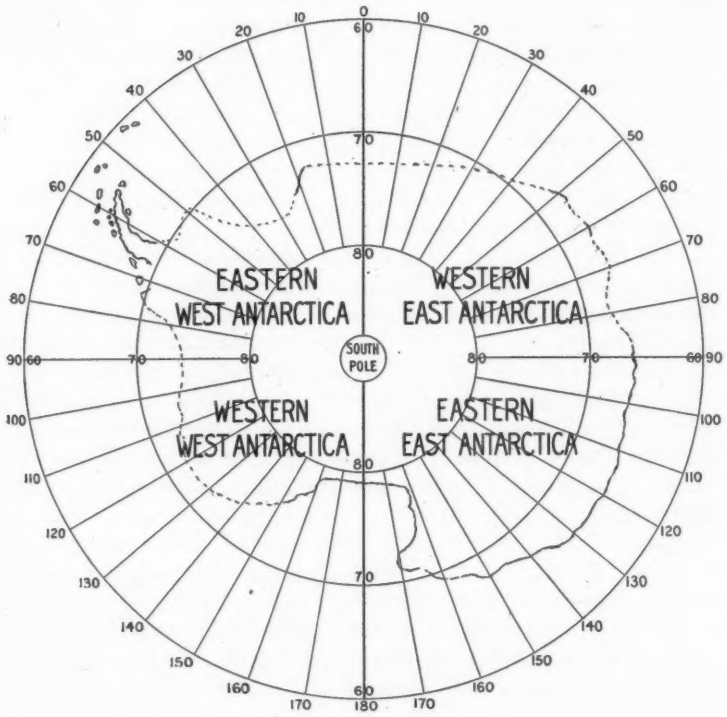


CHART OF
ANTARCTICA
SHOWING SUGGESTED HEMISPHERICAL NOMENCLATURE
DRAWN BY EDWIN SWIFT BALCH MAY 1912

When one turns to the local nomenclature of Antarctica, the proper starting point for its examination is found at once by obeying the guiding principle of priority of discovery. And since the earliest inroads towards the far south were made in West Antarctica, that

region should be studied first. Although it is probable that we shall never know who made the earliest Antarctic discovery, yet on some old maps, dating at least as far back as 1570, there is charted south and east of Terra del Fuego, land with a gulf called Golfo di S. Sebastiano and an island called Y de Cressalina.* And in their shape and orientation there is a striking resemblance to Bransfield Strait and its surrounding shores. It may be therefore that the discovery of land in West Antarctica occurred about the middle of the sixteenth century. This, however, cannot be proved from present knowledge.

The oldest record of crossing 60° S. is the statement made by Laurens Claess of Antwerp, who says that in 1603 he was in a ship commanded by Don Gabriel de Castiglio, that they reached 64° S., and that they had a great deal of snow: but he does not mention sighting land.† The next oldest record is the short account published in 1622 at Amsterdam‡ stating that high mountainous land had been discovered by Dirck Gerritsz in 64° S., south of the Straits of Magellan. The attribution of discovery to Gerritsz was disproved by Dr. Arthur Wichmann,§ but the discovery itself has not been disproved. The account in Herrera, however, attributing the discovery in 64° S. to Gerritsz; and the fact that Laurens Claess, who says he went to 64° S. with Castiglio, had been one of Gerritsz' companions, certainly point towards Castiglio as the sea captain who made the discovery. The position given in Herrera corresponds most nearly with the present Liège, Brabant and Anvers Islands. And it is certainly a curious coincidence that these names should have been given to the spot which corresponds most nearly with that written about in Amsterdam in 1622, and that they are placed near the very parallel mentioned by the Flemish sailor: for every reason, therefore, these names should be considered as fixed.

But how about a name for these three islands together. The name Dirck Gerritsz Archipelago was once applied to all Northeastern West Antarctica. Then it was transferred to the Liège, Brabant and Anvers Islands. Later these islands were called the Palmer Archipelago. Quite recently, Dr. Nordenskjold has suggested calling them Belgica Archipelago. None of these names seems a good one to me. There is no absolute need of having any special collective name for these three islands, but if one is to be given it should be that of the still not certainly known mariner—possibly Don Gabriel

* *Antarctica*, pp. 51–53.
† *Antarctica*, 1902, pp. 46–51.
‡ Herrera: *Description des Indes Occidentales.*
§ *Dirck Gerritsz*, 1899.

de Castiglio—who before 1622 sighted land south of Cape Horn. It would seem as if further information as to their probable discoverer might be sought for and awaited before any collective name be applied to them finally-as an archipelago, but temporarily the most available name would appear to be Castiglio Islands or Castiglio Group, a name which I place on one of the charts accompanying this article to let other geographers actually see it.

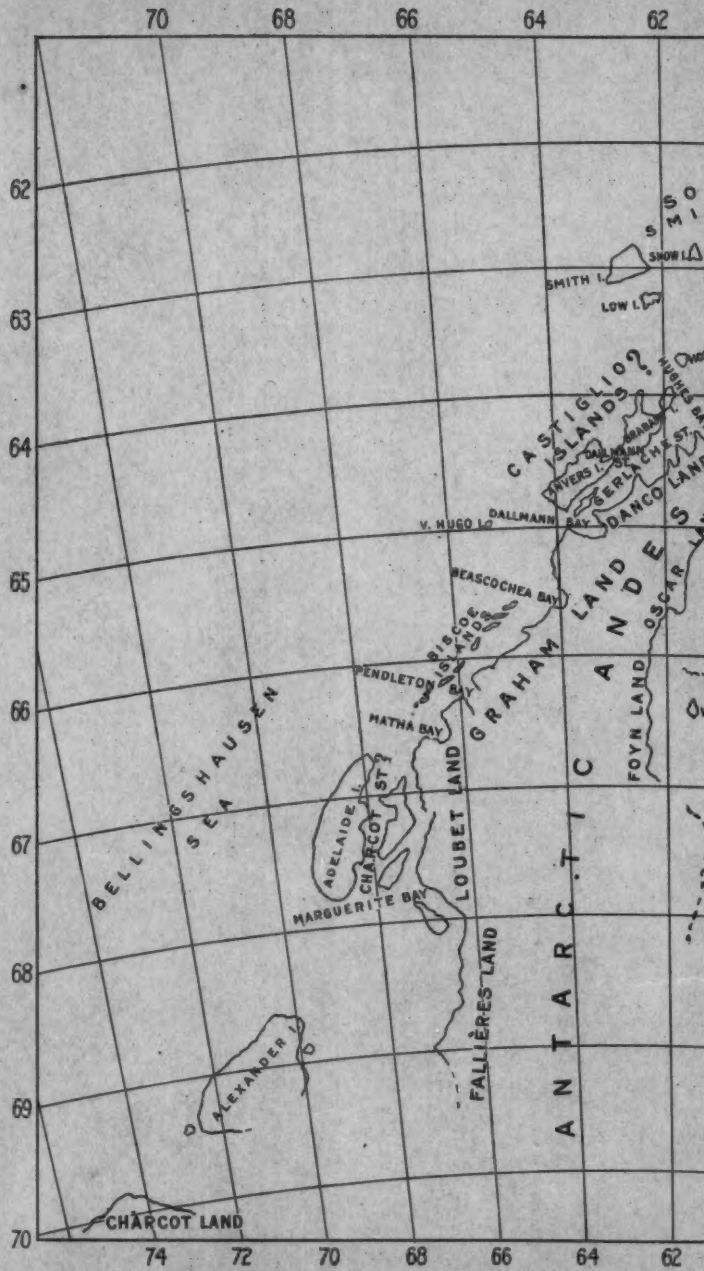
The next discoveries made in the southern portions of the Western hemisphere were some semi-Antarctic islands, the Sandwich Group, the rediscovered South Georgia, and the still uncertain Swain Island. Their nomenclature calls for no remark, except that of the Sandwich Group. Originally spoken of as Sandwich Land, they cannot be called Sandwich Islands on account of the archipelago in the Pacific bearing that name, and Sandwich Group has been wisely adopted.

Following these discoveries came those of the outlying chain of islands of Eastern West Antarctica. There are really three groups of these islands, in approximately the same parallels of latitude. The most westerly of these groups was discovered by William Smith, of Blythe, England, whose accidental landfall Dr. Nordenskjold* was the first to really gauge the importance of. Smith called the islands he discovered the South Shetlands, a name ever since applied not only to the western group, but also to the middle group of Elephant and Clarence Islands. Dr. Nordenskjold now suggests calling the western group, William Smith Group, after their discoverer: an excellent suggestion, especially if shortened into Smith Group.

The most easterly of these groups was discovered by the British sealer George Powell and the American sealer Nathaniel B. Palmer in December, 1821. Powell says he was the first to sight these islands to which he gave his own name. They are usually called the South Orkneys, a name apparently given by Weddell, and although it is doubtless too late to change that name, yet the original name Powell Group or Powell Islands should also be restored as an alternative. Some geographers, Dr. Hugh Robert Mill, for instance,† have already followed the writer in so doing.

The middle group, Elephant and Clarence Islands, has no special name as yet. Dr. Nordenskjold‡ thinks it ought to have one, and with this I heartily agree. For a name, however, he suggests

* *Antarctica or Two Years amongst the Ice of the South Pole*, pp. 67–79.
† *The Siege of the South Pole.* ‡ *Die Schwedische Südpolar Expedition*, p. 70.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SMITH I.
LOW I.
CASTIGLIONI ISLANDS
DANCO LAND
V. HUGO I.
DALLMANN BAY
BEASCOCHEA BAY
BISCOE ISLANDS
PENDLETON STR.
MATHA BAY
GRAHAM LAND
OSCAR LAND
FOYN LAND
BELLINGSHAUSEN SEA
ADELAIDE I.
CHARCOT ST.?
MARGUERITE BAY
LOUBET LAND
FALLIÈRES LAND
ALEXANDER I. LD
CHARCOT LAND
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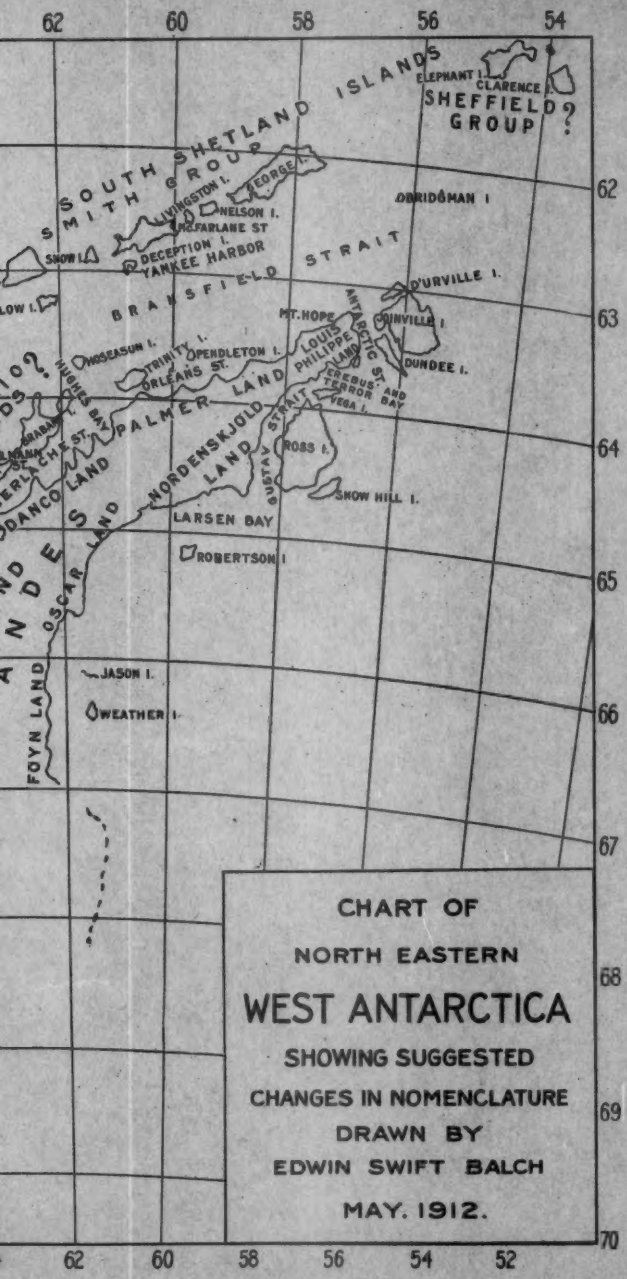

CHART OF
NORTH EASTERN
WEST ANTARCTICA
SHOWING SUGGESTED
CHANGES IN NOMENCLATURE
DRAWN BY
EDWIN SWIFT BALCH
MAY. 1912.

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Powell's, and here I am at odds with him. For in the first place Powell's name is already rightfully attached to the eastern group, and furthermore there is no evidence that the middle group was discovered by Powell. I do not know who did discover the middle group, but doubtless it was some sealer who did not record his discovery. The rightful name for this group, therefore, is hard to specify. The discoverer may still be identified, in which case there should be no hesitation. If a temporary name, however, is wanted, that of James P. Sheffield has distinct claims to consideration. Sheffield commanded the second recorded expedition to the Shetlands, and he made the second recorded landing in Antarctica. It is by no means proved that he had heard of Smith's discovery of the Shetlands: in fact the evidence tends to show he had not.* In view of these facts, I would suggest that the middle group, Elephant and Clarence Islands, be called Sheffield Group.

South of the Shetlands lies Bransfield Strait, correctly named after the English captain whose ship's keel is the first recorded as having plowed its waters. In the midst of the strait lies Deception Island with a fine roomy harbor, Yankee Harbor. It is not known who discovered and named this island nor this harbor, but Yankee Harbor appears to be first mentioned in print in 1833 by Edmund Fanning.† The earliest use in manuscript of the name Deception I have seen is in the letter of E. Fanning and B. Pendleton to N. B. Palmer, dated Stonington, July 21, 1821.‡ Dr. Charcot,§ however, called attention to the fact that in the voyage of 1820-1821, the American sealing fleet sailed to Yankee Harbor as if they knew beforehand all about it: and he thinks therefore that Sheffield and N. B. Palmer may have already been there in the *Hersilia* in 1819-1820, in following the *Esprito Santo* of Buenos Aires.‖ Dr. Charcot reasons further that Deception Island may have been known still earlier to some Argentine sealers. The matter is hopelessly tangled up and impossible to unravel from any data now accessible. But it shows once more that everything is not yet known about the history of Antarctic discovery: that there were probably other voyages than those so far recorded in print: and that possibly the statement of Dr. Berghaus¶ that sealers had plied their vocation in the Shetlands before William Smith's discovery, is correct. Further information

* *Antarctica*, pp. 78–79. *Bulletin American Geographical Society*, 1909, Vol. XLI, pp. 476–477.

† *Voyages Round the World*, etc., pp. 434–440. ‡ *Bulletin American Geographical Society*, Vol. XLI, 1909, p. 483. § *Le Pourquoi-Pas? dans l'Antarctique*, pp. 31–33. ‖ *Bulletin American Geographical Society*, Vol. XLI, 1909, pp. 476–477.

¶ Otto Nordenskjold: *Die Schwedische Südpolar Expedition*, p. 35.

is certainly badly needed. The name of Yankee Harbor was afterwards changed to Port Foster after the captain of the *Chanticleer*. It is important that it should be restored for several reasons. It recalls a vanished period of Antarctic history. In Yankee Harbor the early American and English sealers sheltered their boats. And as there seems to be good evidence that the name Yankee was simply the mispronunciation of the name English by the American Indians, the name Yankee Harbor applies equally well to a port visited by Americans and Englishmen.

To the southward of Deception Island there are several other islands. The largest of these was called, probably by some member of De Gerlache's expedition, Trinity Island. This name is a good one, as it was once used for the northern mainland by Weddell. The second biggest island was christened Pendleton Island by Dr. Nordenskjold, after the senior captain of the first American sealing fleet: the name is a most fitting one and should be adopted. These islands are separated from the mainland by a sound, named by D'Urville Orléans Channel, a name which should also be retained.

The mainland of West Antarctica, was probably first sighted, as far as can be judged from known records, by Nathaniel B. Palmer. Fanning's account can certainly be construed as meaning that Captain Pendleton had the first glimpse, from Deception Island, of the mainland. But Mrs. Loper, Captain N. B. Palmer's niece, has told me that she has more than once heard her uncle, a very keen eyed man, relate how he had discovered Palmer Land from Deception Island. Palmer certainly was the first to explore the coast, and it was first charted as Palmer Land by Powell; then it was charted as Trinity Land by Weddell; then as Louis Philippe Land by D'Urville. The name Palmer Land, restored to this coast by Dr. Nordenskjold and the writer, is in all respects the most fitting name, and it should cover the mainland from 58° W. to 61° W. The name Louis Philippe Land should be retained for the extreme peninsula of the mainland, from 58° W. to Antarctic Sound.

At the eastern extremity of Louis Philippe Land is a mountain, 632 meters high, which is now sometimes charted as Mount Bransfield. Its original name, I believe, was Mount Hope, and it might be well to restore this, because, as far as known now, Bransfield does not seem to have sighted any part of the mainland.

On the east coast of Northeastern West Antarctica, almost all of the names given by D'Urville, Ross, Larsen and Nordenskjold should be definitely accepted. D'Urville, Joinville, Dundee, Paulet,

Vega, Ross, Seymour, Snow Hill and Robertson Islands are all good. So are Antarctic, Sidney-Herbert, and Admiralty Sounds; Erebus and Terror Gulf; and Crown Prince Gustav Channel when shortened to Gustav Channel. A long strip of this eastern coast, between 58° W. and 61° W., that is between Louis Philippe Land and Oscar Land corresponds exactly with Palmer Land on the north shore. I have already proposed* for this land the name of its gallant explorer, Nordenskjold Land, and also charted it in 1909 under that name. The most elementary justice requires this appellation. Nordenskjold Land makes a great curve enclosing a great bay, which I named and charted in 1902 as Larsen Bay† in commemoration of Larsen's discoveries, and this name has been already silently accepted. The shore of the mainland between 60° and 61° W., down to 66° S. will probably retain the name of King Oscar II Land, given to it by Larsen, but shortened into Oscar Land. The shore of the mainland between 66° S. and 67° S. deservedly bears the name of Foyn Land, because Svend Foyn was the principal backer of Larsen's two cruises in the *Jason*.

The coast beyond Foyn Land, from 67° S. on, is still unnamed. Nor is it known positively who first sighted it. Possibly it was Benjamin Morrell. Morrell states‡ that on March 17, 1823, he was off a coast in about 48° W., and 67°-68° S., and that he saw it continuing, with mountains of snow, a long distance southward. He speaks of this land as New South Greenland, a name which has fallen into almost complete desuetude. He must have seen land somewhere near his stated latitude, for his account is the first extant by a number of years of any land southward of Joinville Island. There are certain statements by Fanning, however, as well as certain other evidences which I formerly discussed at length—especially the probability that Morrell's longitudes were inaccurate and that for 48° W. one should read 58° W.—which tend towards showing that Morrell was off the coast south of Foyn Land.§ Dr. Hugh Robert Mill, a dispassionate British writer, appears to endorse this side of the case, for he speaks of Morrell's North Cape of New South Greenland as being probably intended for Louis Philippe Land and Joinville Island.‖ But it is certainly extremely significant that Dr. W. S. Bruce, the discoverer of Coats Land, who has been closer than anyone since Morrell to the position given by Morrell, should mark "New S. Greenland" on his latest chart.¶ It seems as if there must have been some potent

* *Evening Post*, New York, Sept. 24, 1908. *Proceedings American Philosophical Society*, Vol. XLIII, 1909, p. 38. † *Antarctica*, pp. 200–201. ‡ *A Narrative of Four Voyages*, etc., 1832. § *Antarctica*, pp. 100–107. ‖ *The Siege of the South Pole*, pp. 109–110. ¶ *Polar Exploration*, 1911, p. 8.

XUM

cause at work to influence such a reliable scientific observer as Dr. Bruce, and his opinion certainly carries far more weight than any one else's in this matter. If there is land in 48° W., 68° S., and it may be that Lieutenant Filchner will find some there, it should certainly be called Morrell Land. If not, it seems as though the coast south of Foyn Land should bear his name. Under the circumstances, it seems as if the nomenclature of these two spots should be held in abeyance until further exploration.

Eastward of Joinville Island, Nordenskjold Land, etc., a great gulf or bay extends far south into Eastern West Antarctica. It was originally called George the IV Sea by its discoverer Weddell, but now that the reverence for King George IV appears to have vanished in Britain, geographic justice has prevailed, and on the suggestion of, I believe, Dr. Fricker, the portion of the ocean where Weddell made his plucky dash south is becoming known, as it should be, as the Weddell Sea.

The eastern boundary of Weddell Sea is also in Eastern West Antarctica, in the neighborhood of 20° W. The portion which has been sighted is known as Coats Land, a most suitable name and a well-deserved memorial for the gentlemen who helped finance Dr. Bruce's Scotch expedition. Curiously enough, Coats Land is located near to where Mr. Foxton reported that land had been found in 1833 by Lieutenant Binstead. Accepting Mr. Foxton as accurate, I wrote of this land in 1902 as Binstead-Foxton Land.* But Dr. Mill† states that the voyage referred to was really that of Biscoe and Rea, and that the land referred to was some fifty degrees of longitude distant from Coats Land. Biscoe, however, did not go on the voyage of Rea, when one of the latter's ships was crushed by the ice near the South Shetlands‡ and it is probably that voyage which Mr. Foxton had in mind.

From the western end of Palmer Land to the 180° meridian, that is along the western coasts of West Antarctica, almost all the names were given by six explorers, Bellingshausen, Biscoe, Dallmann, de Gerlache, Scott and Charcot. Almost all of their appellations should stand.

Contiguous to Palmer Land we find Danco Land, well named after de Gerlache's gallant companion who gave his life for exploration, and separated from the Castiglio Group, by the equally well named Gerlache Straits. Along the straits, and on the western sides of the Castiglio Islands, the names given by Biscoe, Dallmann, de

Antarctica, p. 122. † *The Siege of the South Pole*, p. 166. ‡ *The Antarctic Manual*, 1901, p. 519.

Gerlache, and Charcot, with two or three exceptions or rather rectifications, must remain. Gerlache Strait itself was first indicated as a strait on Powell's chart. After that for many years, its northern end was charted as Hughes Gulf. It is possible that Smiley may have sailed through Gerlache Strait, but this remains uncertain. Dallmann next visited the southern entrance of these straits, which he called Bismarck Strait. Then came de Gerlache, who named the straits Belgica Strait, a name still occasionally used.* But de Gerlache's comrades, among them Frederick A. Cook and Roald Amundsen, afterwards changed this name to the much better one of Gerlache Strait, which will undoubtedly be finally accepted.

I do not know who gave the name Hughes Gulf to the northern end of Gerlache Strait, although it may have been a Captain Hoseason,† nor whom the name commemorated, but it should not be obliterated. Whilst it cannot remain attached to the body of water encompassed between Trinity Island, Palmer Land, and Liège Island, it might be transferred with fairness to the great bay separating Palmer Land and Danco Land, and called by de Gerlache, Brialmont Bay. I hope that this may be done, and that this bay may hereafter be known as Hughes Bay. The same thing should take place at the southern end of Gerlache Strait, which Dallmann called Bismarck Strait, a name still used by some German geographers.‡ This name will not do, for Dallmann did not sail through Gerlache Strait and did not prove that it was a strait. If such reasoning were followed, Gerlache Strait should be called Palmer Strait, since it is charted as a strait on Powell's chart. But following the precedent suggested for Hughes Bay at the northern entrance of Gerlache Strait, Dallmann's discovery might be commemorated at the southern entrance by remaining the great bay called by de Gerlache Flanders Bay, and naming this Bismarck Bay, or better still Dallmann Bay. The editor of *Stieler's Atlas of Modern Geography*, 1909, appears to be inclined to think much as I do, for he charts a bay in 65° 30′ S. as Bismarck Strait. This corresponds with Charcot's Beascochea Bay. But as Dallmann's discovery was certainly the south entrance of Gerlache Strait, where he must have looked into de Gerlache's Flanders Bay, it seems to me it is more accurate to mark Dallmann's discovery by changing that name into Dallman Bay.

Another important rectification is the name of the strait between

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* Stieler: *Atlas of Modern Geography*, 1906. † *Antarctica*, p. 114.
‡ Andree: *Allgemeines Handatlas: Herausgegeben von A. Scobel*, 1906.

Brabant and Anvers Isalnds. Originally charted from the west as a bay by Dallmann, and called Dallmann Bay, it was afterwards named Schollaert Strait by de Gerlache. This name should certainly be dropped, and the strait called after the gallant German explorer, Dallmann Strait.

From Dallmann Bay, in 65° S., to Matha Bay, in 66°30′ S., the coastal name is crystallizing into Graham Land. Graham Land was discovered before the year 1828 by Benjamin Pendleton, it was named by Biscoe, and it was explored by Charcot. At one time the name of Graham Land was the best known in West Antarctica, and this was undoubtedly due to the Mercator charts magnifying by leaps and bounds out of all proportion the size of the more southerly lands, across which the name Graham Land was printed in huge letters, so that it arrested forcibly the eye, and caused many persons to think it applied to the whole of Eastern West Antarctica.

During the voyage on which Pendleton discovered Graham Land, he sailed into a great bay or strait whose latitude he gives as 66° S. I charted such a bay tentatively in 1902 as Pendleton Bay, and on his recent voyage, Dr. Charcot sailed into a big bay in 66°15′ S., and fixed its name as Pendleton Bay. His courtesy will be much appreciated by Americans.

Off Graham Land, the Biscoe Islands; further south Adelaide Island, named by Biscoe; and Alexander Island, named by Bellingshausen; are all good names. So is Bellingshausen Sea, whose sponsor I do not know, for the great arm of the ocean between the Shetlands and Peter Island. The other names in this quarter are mainly those given by Charcot, such as Matha Bay, Marguerite Bay, Loubet Land, from 66°30′ S. to 68° S., and Fallières Land from 68° S. to 69°30′ S. Charcot Land, in 70° S., was really named by the writer, who has also suggested,* and who would like now to renew the suggestion, calling the straits between Adelaide Island and Loubet Land, Charcot Straits.

In the vicinity of Charcot Land, there is an island which has appeared at least once on a map under the name of "Smilies I." This is on a globe, manufactured by Gilman Joslin in Boston and copyrighted by Charles Copley in Washington in 1852, which is now in the Academy of Natural Sciences in Philadelphia. On this is charted "South Shetland," south of this in about 69°S′ "I. of Alexander," and south of this again, beyond 71° S., "Smilies I." It is impossible to identify this island. Smiley is known to have gone far

* *Bulletin American Geographical Society*, Vol. XLII, 1911, p. 86.

south, but how far cannot be determined. In fact Smiley's own statements are incomprehensible. In a letter to Maury he said he had sailed round Palmer Land and far south of it, and that might be held to imply that he had been beyond Fallières Land. Wilkes, however, states that Smiley wrote to him that Palmer Land consists of islands between which Smiley had entered, and that the passages are deep, narrow and dangerous: so it may be that Smiley was referring to the Castiglio Islands and that he sailed through parts of Gerlache Strait. But as Smiley also says in his letter to Maury, that he had no logs or books remaining which would be of use to Maury, the matter can never be cleared up, unless totally unexpected information should turn up.*

One capital name, suggested, I believe, by Mr. Henryk Arctowski, is the Antarctic Andes for the great mountain range springing up in the South Shetlands and continuing to Fallières Land, where they disappear into the unknown. For these mountains appear to be geologically a continuation of the South American Cordilleras and the name Antarctic Andes suggests both their formation and their relation to the American continent. It may turn out that the Antarctic Andes extend to Amundsen Land and Victoria Land, but the geological formations of Eastern West Antarctica and Eastern East Antarctica appear, according to Dr. Nordenskjold, to be different. Further exploration alone will solve this great geographical problem.

Continuing westward we come to Peter Island, discovered by Bellingshausen. Then, in about 85° W., we pass the spot where de Gerlache struck the continental shelf in soundings: there must be land there to the south which must wait for a name. In about 107° W., there seems to be a gulf in the pack where James Cook in 1774 made his record latitude: this gulf Charcot is inclined to think permanent. Why not therefore call it Cook Gulf? Beyond this Charcot also struck, in about 120° W., the continental shelf, implying a still nameless land in the immediate south. Between 140° W. and 150° W., Cook is perhaps the only explorer who writes of having crossed the Antarctic Circle. Nevertheless, Edmund Fanning† reported an extensive bank of from 60 to 100 fathoms in depth between 66° S. and 69° S., to the westward of 140° W., which he thought may be connected with extensive land to the south. This may prove to be the continental shelf of Antarctica, and if it should turn out that this bank exists, it might well be called Fanning Bank. West and south of this comes Edward Land, where all the various

* *Antarctica*, pp. 186, 187. † *Voyages*, pp. 476–477.

names given by its discoverer Scott must be accepted: as will also doubtless be any affixed by Lieutenant Prestud and Lieutenant Shirase to their own discoveries.

Between Edward Land and the South Pole, all the various nomenclature given by Amundsen, Axel Heiberg Glacier, Devil's Dancing Room, etc., will naturally be immediately accepted. The great area of land which Amundsen discovered, some 500 miles long, should, as already suggested by the writer,* certainly be called Amundsen Land. Some of this, bounding the Great Ice Barrier on the south and for some distance on the east, evidently forms part of the shore line of West Antarctica. There must, however, be a long stretch of unsighted coast, possibly several hundred miles long, between Amundsen Land and Edward Land, still awaiting a discoverer and a name. Haakon Plateau, for the ice cap round the Pole, within the circle of 89° S., is a good name, until geographers decide possibly that Amundsen Plateau might be better. Farther west than Edward Land and Amundsen Land, the names of Ross Sea, and of Great Ice Barrier, sometimes shortened into Ross Barrier, carry the nomenclature into the eastern hemisphere. The name Great Ice Barrier, which appears to have come about almost accidentally but naturally, is not only descriptive, but extremely individual.

In the eastern hemisphere the first discoveries were some semi-Antarctic islands, and these in time received the names of their discoverers, Bouvet, Marion, Crozet, and Kerguelen Islands, as was also the case later with Heard and McDonald Islands.

Starting at the meridian of Greenwich and working east no land has been sighted until 50° E., where Enderby Land, well named after Biscoe's employers, is reached. It is probable that Enderby Land is the edge of the continent. Benjamin Morrell† reported reaching 60°11′ S., 48°15′ E., which would be almost south of Enderby Land: but as Morrell's longitudes, as already mentioned, were probably wrong by some ten degrees, it may well be that he was in 38° 15′ E., instead of 48° 15′ E.: a possibility which appears to have been unnoticed as yet. Further exploration must be awaited to learn whether there is salt water at 69°11′ S., 38°15′ E., and whether Enderby Land is part of the continent. In about the same latitude as Enderby Land, Kemp Land, correctly named after its discoverer, is next reached in about 58° E. Beyond Kemp Land

* *Bulletin American Geographical Society*, Vol. XLIV, p. 165.
† *A Narrative of Four Voyages*, etc., p. 65.

the icy pack has again baffled the efforts of navigators for a long distance. In about 76° E., however, Nares crossed the Antarctic circle, and sailed into a sort of gulf in the pack which may perhaps mean an indentation in the coast there. No name has been given to this as yet. But as the great Scotch oceanographer, Sir John Murray,was then on board the *Challenger,* it would seem appropriate to commemorate his services to Antarctic geography by naming this spot Murray Gulf. East of Murray Gulf, the coast of East Antarctica again remains unsighted until the land discovered by the Drygalski expedition between 92°30′ E. and 90° E. is reached. They named this land Kaiser Wilhelm II Land, a name shortened by Bruce into Wilhelm Land; and this name will doubtless remain for awhile, but in fifty or a hundred years it may be replaced by Drygalski Land. The mountain discovered there is most appropriately called the Gaussberg.

Continuing east, the coast of East Antarctica extends from about 94° E. to about 153° E., somewhat south of the Antarctic Circle. This is where Lieutenant Charles Wilkes, U. S. N., made, in 1840, his immortal discoveries. For he recognized, one might almost say by the intuition of genius, that he was on the edge of a continent, instead of on that of a frozen ocean whose existence was then generally accepted. His discovery revolutionized all conceptions of the Antarctic and was the starting point of all our present ideas. He called this land The Antarctic Continent, but it soon began to appear on maps, most justly, as Wilkes Land. For the name Antarctic Continent inevitably had to be borne by the entire continental mass Wilkes first told the world of, and some geographers instinctively recognized that the portion sighted by Wilkes ought to bear his name, in commemoration of his great service to science.

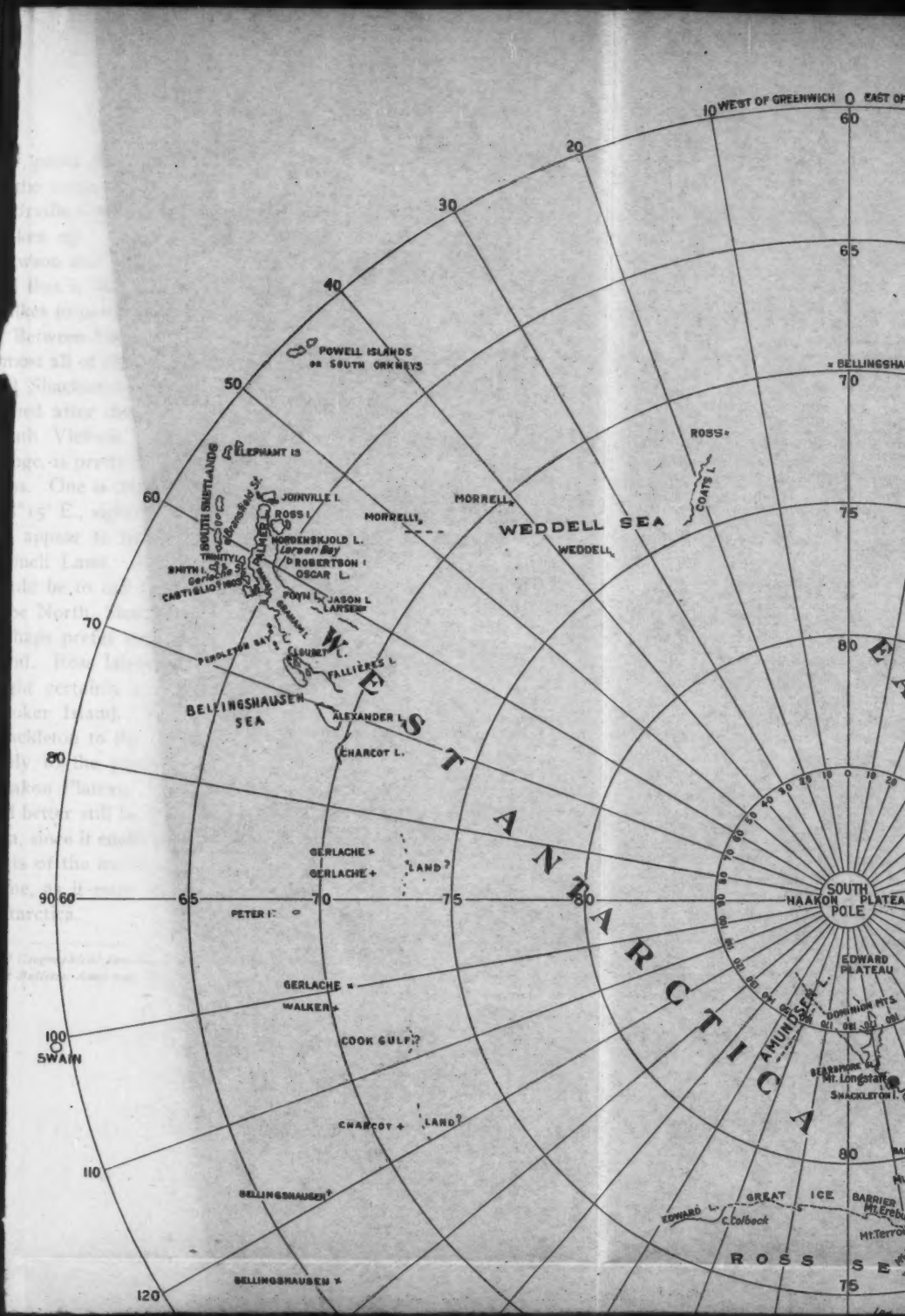
Wilkes also christened a number of places on the coast of Wilkes Land, chiefly after various officers of the United States Exploring Expedition. From west to east, he gave the names of Termination Land, Repulse Bay, Knox's High Land, Budd's High Land, Totten's High Land, North's High Land, Porpoise Bay, Cape Carr, Piner Bay, Point Alden, Point Case, Disappointment Bay, Point Emmons, Peacock Bay, Cape Hudson, Reynolds' Peak, Eld's Peak, and Ringgold's Knoll. It would seem advisable to change a little the form of some of these names. Knox's High Land, Budd's High Land, Totten's High Land, and North's High Land, must be shortened into Knox Land, Budd Land, Totten Land and North Land. Cape Carr, Point Alden, Point Case, Point Emmons and Cape Hudson, which

in each case imply land, must be changed into Carr Land, Alden Land, Case Land, Emmons Land, and Hudson Land. It is probable, however, that most of the lands discovered by Wilkes are a little further south than Wilkes charted them; for it is a well-known fact that distances in the Antarctic are almost always underestimated. This has already proved true of Carr Land and Termination Land, and it will doubtless prove true of Hudson Land. It may also turn out that the three small islands Wilkes thought he sighted, Reynold Peak, Eld Peak and Ringgold Knoll, were monster icebergs: but this is not proved as yet. Wilkes did not give any name to the rocks seen by Pinkney of the *Flying Fish* in 65°58′ S., 157°49′ E., and this omission should be rectified by christening them Pinkney Island.

Two points of Wilkes Land were sighted by other explorers than Wilkes and his companions. One is in about 128° E., and was discovered by John Balleny, who called it Sabrina Land, in memory of his second vessel, which was lost with all on board in the Antarctic seas. The other is in about 140° E., and was discovered by the great French navigator, Dumont d'Urville, who landed there and was the first to tread on solid rock in East Antarctica. He called this coast Adélie Land, and this name is probably too well fixed to alter it, as would be only just, to D'Urville Land. An ice barrier in about 134° E., formerly supposed to have been discovered by D'Urville and named by him Côte Clarie, was recently proved by Rear Admiral John E. Pillsbury to have been first sighted by Lieutenant Ringgold of Wilkes' expedition.*

The preliminary report of the Australasian Antarctic Expedition under Dr. Mawson† to Wilkes Land absolutely corroborates Wilkes. Wilkes Land evidently is located just where Wilkes said it was, only a little further south. Although the *Aurora* was a steamer, built for ice navigation, however, Captain Davis was unable to hug the shore as closely as did Wilkes in his undefended sailing ships. But Davis saw such innumerable monster icebergs and such tremendous stretches of barrier ice, that he proved definitely anew the continuity of the coast line of Wilkes Land somewhere along 67° S. Between Adélie Land and Carr Land, Davis discovered a great bay which he named Commonwealth Bay. Davis also located Carr Land about one degree south, and Termination Land about two degrees south, of Wilkes' positions for them. Totten Land Davis did not see, although his soundings in 340 fathoms and the immense collection of bergs he

* *The National Geographic Magazine*, Vol. XXI, 1910, pp. 171–173.
† *The Geographical Journal*, Vol. XXXIX, 1912, pp. 482–486.


WEST OF GREENWICH
EAST OF
POWELL ISLANDS OR SOUTH ORKNEYS
ELEPHANT IS
SOUTH SHETLANDS
JOINVILLE I.
ROSS I.
MORDENSKJOLD L.
Larsen Bay
ROBERTSON I
OSCAR L.
FOYN L.
JASON L.
LARSEN
GRAHAM L.
CLOUET L.
FALLIÈRES L.
ALEXANDER I.
CHARCOT L.
PALMER
SMITH I.
TRINITY I.
CASTELLO I.
PERDLEVIN BAY
MORRELL
MORRELL
WEDDELL SEA
WEDDELL
COATS L.
ROSS
BELLINGSHAUSEN SEA
WEST ANTARCTICA
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PETER I.
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WALKER
COOK GULF?
CHARCOT
LAND?
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BELLINGSHAUSEN
SWAIN
SOUTH POLE
HAAKON PLATEAU
EDWARD PLATEAU
DOMINION PTS.
AMUNDSEN L.
BEARDMORE GL.
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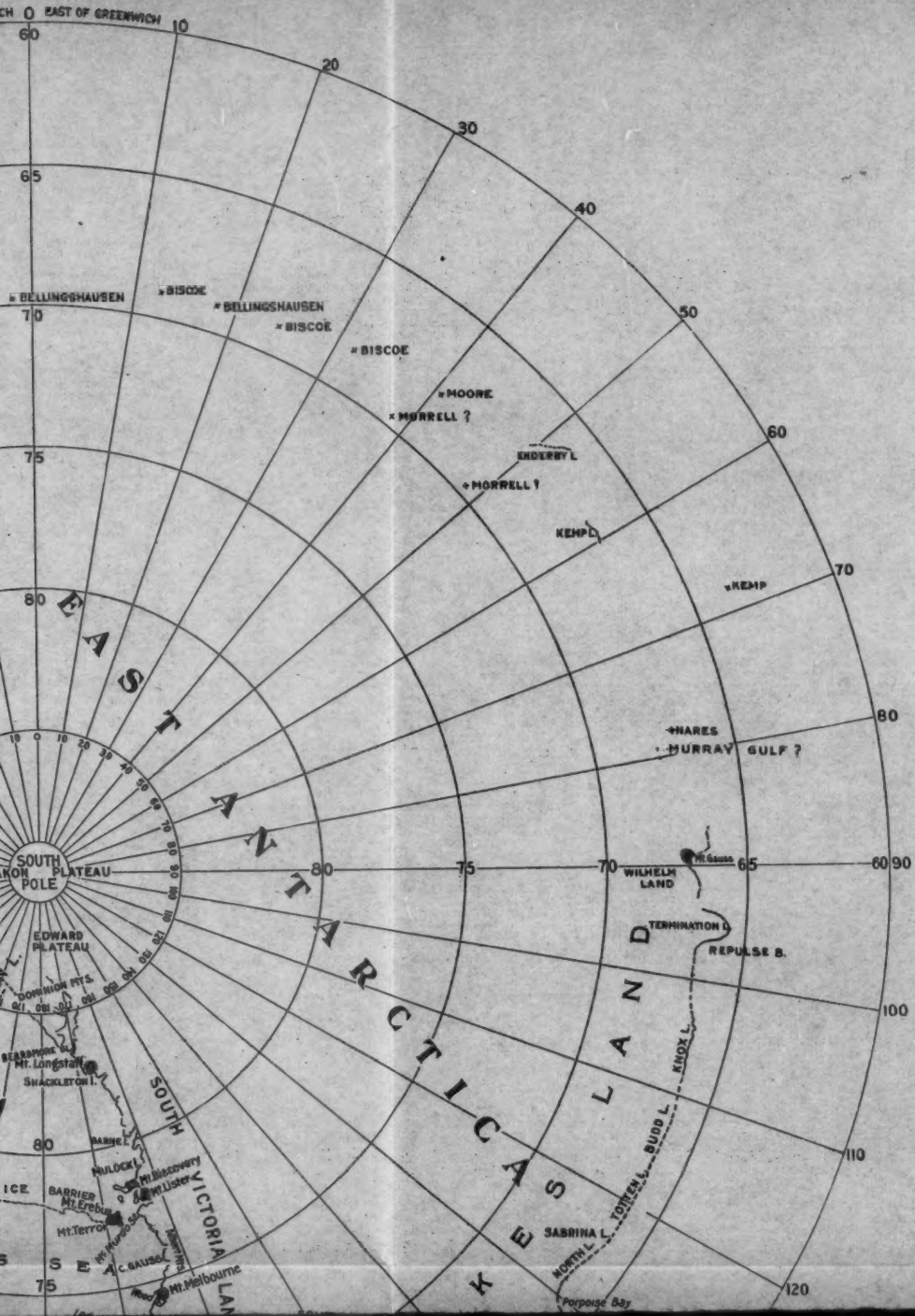
C. Colbeck
Mt. Erebus
Mt. Terror
ROSS SEA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KEMP L.
KEMP
NARES
MURRAY
GULF ?
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EDWARD PLATEAU
EASTANTARCTICA
WILHELM LAND
TERMINATION L.
REPULSE B.
KNOX L.
KESLAND
BUDD L.
TORRENS L.
SABRINA L.
NORTH L.
Porpoise Bay
DOMINION PTS.
SHACKLETON I.
Mt. Longstaff
SOUTH VICTORIA LAND
BARNE L.
MULOCK L.
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Mt. Lister
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C. BAUSE
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SEA

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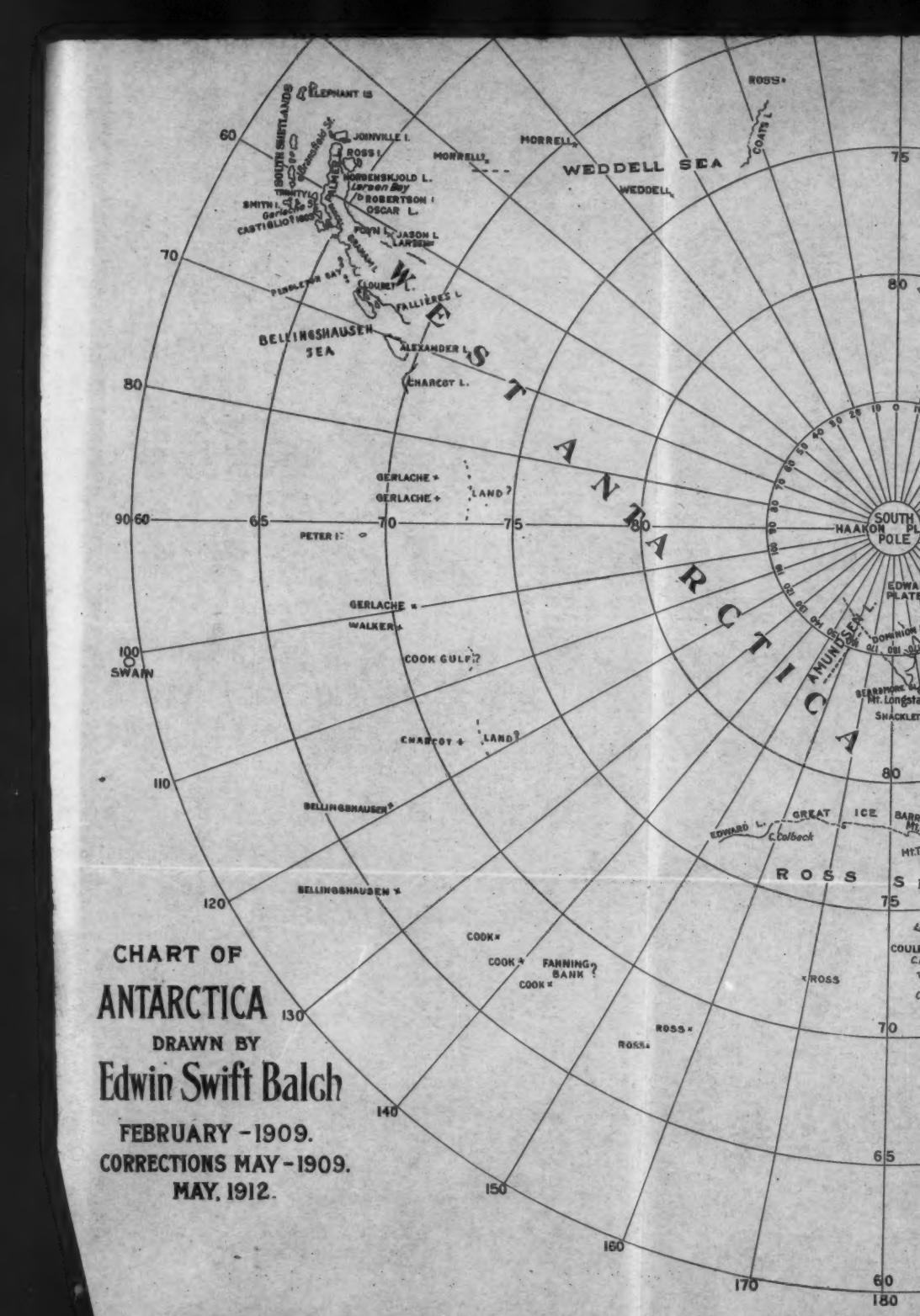

CHART OF ANTARCTICA

DRAWN BY

Edwin Swift Balch

FEBRUARY - 1909.

CORRECTIONS MAY - 1909.

MAY. 1912.

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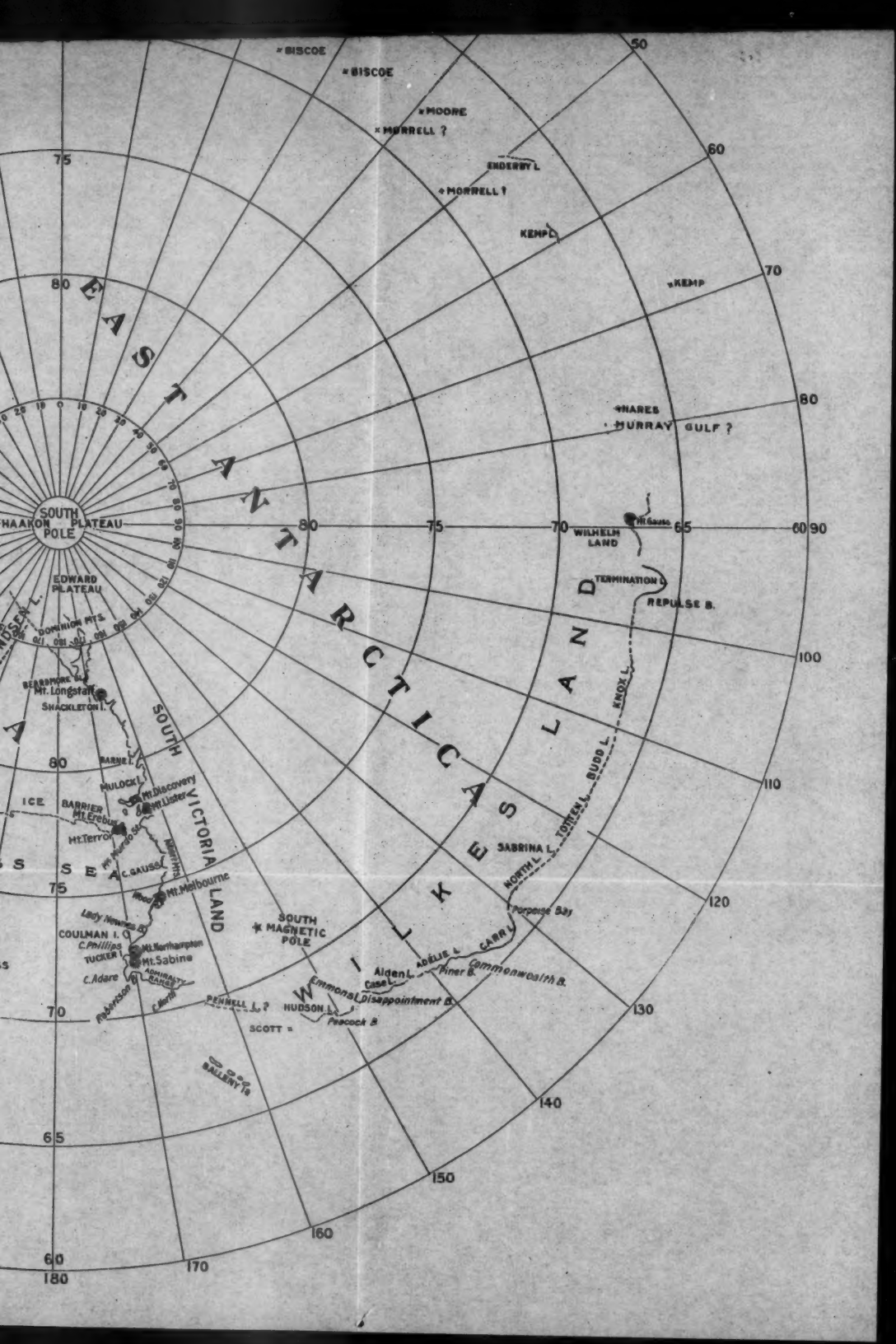
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EDWARD PLATEAU
DOMINION PTS.
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MULOCK I.
Mt. Discovery
Mt. Lister
BARRIER
ICE
Mt. Erebus
Mt. Terror
C. GAUSS
Mt. Melbourne
Lady Newnes Bay
COULMAN I.
C. Phillips
TUCKER I.
Mt. Northampton
Mt. Sabine
C. Adare
ADMIRALTY RANGE
C. North
PENNELL I. ?
SOUTH MAGNETIC POLE
HUDSON L.
SCOTT
Peacock B.
Emmons L.
Disappointment B.
Alden L.
Case L.
ADELIE L.
CARR L.
Piner B.
Commonwealth B.
Porpoise Bay
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saw, prove that Totten Land is located also perhaps a degree or so to the south of Wilkes' position for it. The ice barrier, called by D'Urville Côte Clarie, was found by Davis, at least to some extent, broken up. As far as the nomenclature is concerned, therefore, Mawson and Davis' explorations bring out one fact preeminently, and that is that the name Wilkes Land, and all the names given by Wilkes to parts of Wilkes Land, must stand for all time.

Between Hudson Land, the 180th meridian, and the 89th parallel, almost all of the names given by Balleny, Ross, Borchgrevink, Scott and Shackleton, must be accepted. The Balleny Islands are well named after their discoverer, John Balleny. The nomenclature of South Victoria Land, from Cape North to the Commonwealth Range, is pretty well established. It is open to two or three suggestions. One is that the coast, in 69°50′ S., 163°20′ E., and 68°30′ S., 158°15′ E., sighted by Lieutenant Pennell of the *Terra Nova** does not appear to have been named as yet, and might well be called Pennell Land. Another suggestion, already made by the writer,† would be to call the coast discovered by Shackleton to the west of Cape North, Shackleton Land. British geographers, however, may perhaps prefer considering these coasts as parts of South Victoria Land. Ross Island, on account of Ross Island in West Antarctica, ought certainly to be renamed: and a good substitute would be Hooker Island. The name King Edward VII Plateau, given by Shackleton to the ice cap south of Victoria Land, must be held to apply to the portion of the ice cap between Victoria Land and Haakon Plateau. It might well be shortened into Edward Plateau and better still be changed to Shackleton Plateau. It is an excellent idea, since it enables accuracy in writing, to christen in such wise any parts of the ice cap reached. The entire plateau needs no especial name, as it must inevitably be spoken of as the Great Ice Cap of Antarctica.

* *Geographical Journal*, 1911, Vol. XXXVII, p. 569.
† *Bulletin American Geographical Society*, 1910, Vol. XLII, p. 21.

FISHERIES

AN EXAMPLE OF THE ATTITUDE TOWARD RESOURCES

BY

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The attitude of a people toward their resources usually passes through four stages. At first, when population is scanty and resources in great abundance, men look upon their natural riches as unlimited in amount. Secondly, blinded by a seeming plenty, each community becomes recklessly prodigal in the use of its wealth. In the third place, as a result of long-continued waste there is a shortening of the supply in some one or more cases. This brings about a feeling of unrest and protest. Either immediate actual exhaustion threatens or timely Cassandra voices are sufficiently strong to bring about restrictive measures. Such measures seek to control the utilization of nature's gifts so as to conserve them. The final step is a concerted effort to replenish or restore the resource to its original abundance. In the United States there are many illustrations of the first three stages.

Our forests were considered so abundant as to be a positive detriment to spreading settlements. Natural gas was looked upon as arising from an unlimited reservoir in the earth's interior. New farms were to be had for the taking. As a result, lumber companies were allowed to slash their way unchecked through our forests with no thought except to cut the greatest amount of wood in the shortest time, regardless of injury to the forests or to the streams arising in the forests. Natural gas was allowed to escape into the air unused, or was transmitted in leaky, loose-jointed pipes to a city where it was burned continuously day and night. Farms have been single cropped until the soil fertility has been exhausted, or so carelessly plowed that the rains have washed the soil completely away. The growth of population, the advancing cost of living, the knowledge that multi-millionaires were being created by unrestricted private use of public wealth, and the actual dwindling of certain necessaries, called attention sharply to their limitation and the prevalent wastes. This condition gave rise to the conservation movement. But the

movement is so recent in the United States that there has been, as yet, no adequate illustration of the complete restoration on land of those resources that lend themselves to replacement. To find a resource that has fully passed through all the four stages outlined above, we must leave the land and look in the sea. In fisheries we began with a great plenty which caused corresponding wastes. Then we had a period of uneasiness culminating in the cry for conservation. Finally has come a restoration of certain exhausted species.

Period of Abundance

In recounting the glories and possibilities of the new land he had discovered, Columbus laid emphasis upon the fish that abounded in its waters.* He claimed they would furnish a never failing supply of food. Similarly, a few years after Columbus, Cabot reported his discoveries to the King of England, and advanced as one of the reasons for considering his new found land of great importance the fact that the waters washing the continent teemed with fish. The English colony founded at Jamestown turned to the abundant supply of oysters and fish in the neighboring streams in periods of food shortage.† The Pilgrims in seeking permission from their King to found a colony in America based their claim on the fishing to be obtained of which wondrous tales had been brought home by whaling fleets.‡ Their colony was nearly as much a fishing venture as a seeking of religious liberty. As in the Virginia colony, the fish off their coast kept them alive when their harvest failed.§ Immigrants' letters were full of astonishment at the great quantity of fish in the waters of their new home. So plentiful were fish that they were considered poor food, fit only for servants or slaves. A gentleman would not eat fish until hunger forced him to it. Even the servants objected to eating too much fish. Apprentice indentures frequently bore a provision that an apprentice was not to be made to eat fish more than three times a week.‖ Fish that are to-day valuable as sources of food were then used for fertilizer. The abundance of whales and cod was the very foundation of the Massachusetts colony.¶ The state has recognized this fact by suspending a great model of the cod above the desk of the Speaker of House of Representatives, a sight which always causes comment by tourists. Tales of plenty are not

* Fishing Industry of United States. S. Brown Goode.
† Fishing Industries of United States. S. Brown Goode.
‡ History of Whaling Industry. Walter S. Tower. Political Economy and Public Law Series No. 20.
§ Fishing Industries, U. S. Goode.
‖ Handbook. International Fisheries Exhibit. London, 1883.
¶ History, New England Fisheries. McFarland. D. Appleton & Co., 1911.

confined to the colonial period but extend to the days of our own fathers. Such a fish as the sturgeon was caught in so great numbers as to be piled on shore like railroad ties, to burn or to decay.* There are many records of fish jumping into the open boats of the fishermen. Everywhere, then, there were fish in great plenty in American waters.

The Period of Waste

The greatness of the resource in fish has been equalled by the reckless manner in which it has been utilized. Our fishing has been like primitive hunting. All thought has been on present gain without any regard for future supply. In fishing as in hunting, when one region or species was exhausted, it was easy to move to another. This has been a world experience, so is not limited to United States. Ages ago, at the annual overflow of the Nile many fish were stranded. The Egyptians gathered only the largest fish for food, leaving the smaller ones on the banks to die. It was not long before there was a noticeable decrease in the number of fish in the Nile. There were no longer large fish in the receding waters. Then the Egyptians tried throwing the formerly despised little fish back in the river, an expedient which was successful in restocking the stream.†

In Greece also a species of fish like our mackerel, called "thunnier" by the natives, were driven into bays and lagoons in great numbers and there killed with sticks. Greece won fame as a fishing center, but shortly her waters were so depleted that fishermen had to seek elsewhere for their prey.‡

The shallow waters of the British Isles and the numerous estuaries that once abounded in fish have been so exhausted that fishing boats now have to go far from land for their hauls.

There are several reasons for over-fishing. In the first place man cannot resist gorging in the face of plenty. When there is more than enough, men take more than they need. Abundance breeds the idea that abundance will always prevail, so carelessness creeps in. When fish are plentiful they are cheap; in order to make a profit the fisherman must take large quantities. They cannot afford the time and care necessary to prevent waste. Attention is centered on making money quickly. As the supply of fish begins to dwindle the price rises, so men become more and more eager for large catches. The

* Unparalleled Extermination of a Species. The Sturgeon. W. S. Tower. Popular Science Monthly, October, 1908.

† Fisheries and Fishes of All Nations. W. M. Adams. London Handbook, 1883.

‡ W. M. Adams. Fisheries and Fishes of All Nations. London Handbook, 1883. Great International Fisheries Exhibition.

difference in price offsets wastes, so no attention is paid to preventable losses until some outside force compels more careful methods. The outside force may be legal governmental restrictions or it may be the exhaustion of the supply of fish.

There are many examples in the fish family of members once plentiful reduced to a few. Among them are the lobsters, shad, and oysters. Lobsters are taken to illustrate the working of the law of extermination in the sea. Shad, salmon and sturgeon show the same process at work in rivers, and oysters prove that bays are not exempt from man's aggressive greed.

(A) The Lobster*

Lobsters were once abundant all along the Atlantic coast from Delaware Bay to Labrador. The chief centers, however, were off the coasts of Maine and Nova Scotia, because the lobster prefers cool water, and a rocky bottom, where there is a greater likelihood of food. The lobster is the goat of the sea, eating anything, alive or dead, vegetable or animal. In the Maine region lobster catching has been an important business for more than a century. Catches have been enormous, amounting in 1889 to 30,000,000 pounds.† The lobsters, too, were of large size—often attaining twenty pounds apiece, and sometimes as high as forty pounds—a contrast to our present two pounders. The delicate flavor, so widely popular, the ease of catching and the great numbers caused lobstering to be conducted on a large scale. The lobster was able to resist its natural enemies, but when man was added, the fight for existence was too unequal and almost total extermination took place. The female does not produce eggs until she is three or four years old, and then produces only at two-year periods. After the eggs are extruded from the body they are carried for nearly eleven months in the tail of the female. With such a precarious existence it is surprising that lobsters survive at all, but nature has adjusted a nice balance between reproduction and extermination. When man appears as an enemy he upsets nature's balance. He takes all kinds of lobsters, large and small, male and female, with or without eggs; so it is only a question of time when lobsters cease to exist. The 30,000,000 pounds taken in 1889 shrank to 15,000,000 in 1898† and continued to decline until recently, when artificially propagated lobsters began to appear in the catches. As the quantity of lobsters declined, the price per pound went up. In 1880, lobsters sold for 3.6 cents per pound.

*Reports, U. S. Fish Commission. Ency. Britannica. New International Ency. Fishing Industries, U. S. S. Brown Goode. †Statistical Abstract of U. S.

XUM

In 1898 the price was 8.7 cents and in 1908 it had reached 12 cents.* So as man's operation began to show in a declining supply the search for lobsters became more and more keen. Protective laws were flagrantly violated in order to supply the hotels and the homes of the rich with the delicacy they demanded. The lobsters were in danger of utter annihilation. The efforts to prevent extermination are told later in this paper.

(B) The Shad

There is a group of fish,—called anadromous—that begins life in a river, goes out to sea to live and returns to the river to spawn. To this family belong the salmon and the shad. The story of the river-seeking shad is similar to that of the sea-dwelling lobster.

The shad, at one time, ran in all the Atlantic rivers from the Gulf of St. Lawrence to Florida, but chiefly in Chesapeake Bay and its tributaries and in the Delaware, Connecticut and Kennebec.† An allied species ascended the Mississippi River as far as the Ohio. They were also found in the streams discharging into the Gulf of Mexico.† Shad were so plentiful that only the poorest people ate them. They were used principally for fertilizer. Their chief value lay in the fact that as the young shad made their way from the river to the sea they attracted inshore the deep sea cod and halibut, thus avoiding the necessity for long sea voyages to catch the latter. As population increased and pressure upon food resources became greater, the shad were used for food. Since the shad forced their way up the river in great schools to spawn, their capture was easy. Every wholesale catching device was used. Nets and other obstructions were stretched across the rivers, especially near the river mouth. On the Potomac one net took 3,600 fish at a single haul.‡ One seine net caught 11,000 shad in a week on the Roanoke River in 1895.§

In each of the chief rivers the average daily haul was never less than 3,000 fish. Explosives to stun and kill the fish added to the catches by net.‖ Very few fish reached the spawning grounds. The offspring of the few which did survive had a hard struggle to live. Many of the streams in which shad ran were used to dispose of the sewage of surrounding towns. The water thus polluted poisoned the young shad.¶ Saw mills emptied their dust into the streams. This caught in the gills of the fish, suffocating and poisoning them.**

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* Statistical Abstract, United States. † Communication Commissioner Fisheries, 1912.
‡ U. S. Bureau Fisheries. An article by Hugh Smith, pub. by the dept. for the International Fisheries Congress in 1908. § Shad Fisheries of Atlantic Coast. U. S. Fisheries Bureau.
‖ Report Maine Fish Commission, 1906. ¶ Report Penna. Fish Commission, 1906.
** Report Maine Fish Commission, 1903-04.

Farming operations on the banks of the streams so muddied the waters that the young fish were choked.* So it was a lucky fish that escaped to sea with its life. As railway building extended markets, as better methods of canning were adopted and as uses were found for former waste products, the tackle and methods of catching the shad were vastly improved.† Since all the fish were taken before or during the spawning season, few reached the spawning grounds. Added to all the other agents of destruction was the obstructing of streams with dams to develop water power. It is no wonder that the run of shad in some rivers ceased altogether, and in all rivers was greatly decreased. The Connecticut rivermen used to sell 500,000 shad a year. To-day they sell considerably less than 50,000.‡ The efforts to restore the shad fishery belong properly to another section of this paper.

(c) The Oyster§

The denizens of the sea have suffered at man's hands, the residents of the river have been nearly exterminated by him. The humble dwellers in the bays have not escaped. The oyster can be found all along the Atlantic coast from Texas to Massachusetts. Its real home, however, is in Chesapeake Bay with Baltimore as the largest canning and shipping center. Special trains running on the schedule of the fastest expresses carry oysters nightly from Baltimore to Chicago and St. Louis. Man has been the oyster's most dangerous enemy, for in his haste to make large profits man has taken away from the beds all kinds of oysters, large and small. Not enough are left to perpetuate the stock. An oyster grows an inch or more a year until about four years old, then grows more slowly. They should not be taken from the beds until the maximum size is reached. Enough oysters should in any case be left to carry on reproduction, and to provide fastenings for the young oysters. As in forests, the amount taken away each year should not be more than the growth for that year. But man has too frequently taken all the oysters from a given bed. So extensive was this practice that the danger of annihilation was serious. Only the work of states and especially of the United States Fish Commission has prevented this calamity.

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* Shad Fisheries of the Atlantic Coast. Bureau Fisheries. † Fisheries of U. S. S. Brown Goode.
‡ Statistical Abstract, U. S. § Oysters and Methods Oyster Culture. H. F. Moore. U. S. Fish Comm.; Condition and Extent of Natural Oyster Beds of Delaware, Doc. 745; Oyster Culture Experiments in Louisiana, Doc. 731; Condition and Extent Oyster Beds James River, Doc. 729; Volumetric Studies of Food and Feeding Oysters. Bureau Fisheries.

XUM

Conservation*

About the middle of the last century, much uneasiness was felt concerning the wholesale destruction of our fish. The States first tried to prevent some of the waste by legislation. Fines were imposed for taking fish under certain size, with eggs, or at certain seasons of the year. These laws were not very effective, because they were too easy to evade. The unrest finally crystalized in an Association of those most interested in fisheries. Through the efforts of this Association, Congress in 1871 created the United States Fisheries Commission. The Commission's first work was an investigation of all commercial fish along the Atlantic coast and Great Lakes. The study was thorough. All the factors concerning fish were investigated, the habits of the fish, its enemies and friends, the effect of currents and temperature; the migration habits and causes for migration, the methods of reproduction and growth. A study was made of fishing grounds so as to extend fish resources, and obtain greater yields with better conditions. Types of vessels and fishing gear were carefully tested so as to recommend ways of avoiding wastes. Experiments were made with the various parts of the fish so as to make as much as possible salable and as little as possible waste material. Methods of transporting, canning and preserving fish were investigated so as to cut down loss. Foreign experience was drawn upon to help solve domestic problems. Finally, a fish pathologist has been employed to study the cause and cure of diseases in fish. The work has been carried on by the Commission itself, by experts it has called in from time to time, and by volunteer scientists. The examples chosen for this paper, the lobster, shad and oyster were among the earliest to be thoroughly investigated in the ways outlined.

Restoration

At first the United States Fish Commission was an investigating body purely, but the second year of its existence it was authorized to propagate fish. This has since been the largest part of its work. Eggs that would otherwise be lost are taken from fish caught for market and hatched at the government hatcheries. The fish hatched from the eggs are first made to replenish streams or waters from which the eggs came. Then the various State Commissions receive supplies of eggs. Finally, private individuals, through their Senators or Representatives, may obtain fish to stock private or public waters.

*Work of U. S. Fish Commission. S. B. Goode. London Handbook. Bureau of Fisheries; Hugh Smith. *Nat. Geog. Mag.*

Before man's interference nature had adjusted the reproduction of fish to their extermination by natural enemies. When man was added as an enemy he upset the balance and so nearly exterminated the fish. Now in the capacity of friend, man is going to the other extreme in his efforts to replenish the fish supply. He offsets the natural enemies. The most dangerous period for any fish is during the earliest stages of its life. In the case of the lobster, as soon as the eggs are hatched, the young spend their first three months swimming as larvæ on the surface of the water. At this period they are devoured in countless numbers by surface swimming fish. At the end of the larvæ span the young lobster sinks to the bottom of the sea, and becomes the prey of every ground feeding fish. In periods of stress, even the adult members of its own family eat it, for lobsters are atrocious cannibals. During the first year the lobster molts or changes its shell seventeen or eighteen times. Each molting is a dangerous period and the mortality at such times is high. During the body change the lobster is without its natural hard shell protective covering and so is peculiarly defenseless. Artificial reproduction saves young lobsters from many of these vicissitudes. There are no natural enemies in the tanks of the hatcheries. Even the molting stages are carefully guarded, so a lobster that begins life under artificial conditions has a far greater chance of surviving than if hatched naturally. Lobsters are not planted until their most dangerous period is over, and they are able to meet natural enemies, well protected.

Similarly it is better for a shad to start life in a tank than in a river. Shad do not copulate. The female sheds spawn into the water and the male extrudes milt. If these two meet the eggs are fertilized. There is much loss of eggs by failure of the spawn and milt to intermingle. Spawn and milt are also eaten by other fish and by insects. Under artificial conditions the mingling can be controlled and so there is surety of the eggs being fertilized. Insects can be screened. In the river, if the eggs are fertilized, they sink to the bottom where eels devour them in quantities. Floods and receding waters destroy countless eggs. After hatching, muskrats and larger fish prey upon the infant shad, and at the river mouth, cod and haddock hungrily await their coming. In the hatcheries there are no eels, no muskrats, no fish enemies, no floods and no receding waters, so young shad hatched artificially do not have to run the long gauntlet that their relatives of the river must pass in order to live. So the number of shad that reach the planting size

XUM

is much greater under hatchery conditions than under ordinary conditions. Man then is a benefit to the fish by protecting it from a host of enemies during infancy, when it is most likely to lose its life. Before 1880 shad decreased in every river along the coast. Artificial propagation has stopped the decrease, and in spite of more efficient fishing gear, shad are once more so abundant that there is no species of fish more important to residents of the entire Atlantic seaboard.*

Especially equipped tank cars, six in number, are used to transport young fish wherever railroads go, and large cans, like those used for milk, carry the fish from the railway station to the place of planting. Sea work is done by a large vessel, the *Albatross*. For inland or river work the *Fishhawk*, a small boat, is used. The Commission owns several still smaller craft.

Hatcheries have been established at points where special fish were being exterminated. For several years lobsters have been systematically hatched and planted along the Maine coast. This artificial propagation is just beginning to show in the catches. Fishermen report more and more numerous young lobsters; so the tide of annihilation has been turned and soon artificial reproduction may overtake consumption. Man will then have restored the balance of nature which he had so rudely upset. Shad have been kept running by establishing hatcheries near streams that long ago would have been fished out, if left to natural results. Shad were introduced on the Pacific coast in 1885. The cost of planting was $4,000. The annual net return is $330,000 to-day, so that one experiment at least is paying a handsome dividend. Ever since 1867 artificial reproduction has kept shad running in the Connecticut River. Shad have been planted in Atlantic coast rivers by the billions.

The result of investigating the oyster industry has been to cause the various States most concerned to pass laws regulating the beds, the size and number of oysters to be taken, and the policing of the beds. Oyster preservation and propagation differs from lobsters and shad in that oysters are not hatched from eggs away from their natural habitat. We have no oyster hatcheries. Results similar to those obtained for other fish at hatcheries are provided for oysters by better care of the beds.

Young oysters are minute larvæ that swim on the surface of the sea. Menhaden, alewives, mackerel and other surface swimming fish feed on them at this stage. Soon the young oyster sinks to the

* Shad Fisheries of Atlantic Coast. U. S. Fisheries Bureau.

bottom of the sea and attaches itself to some object which must be clean and remain long enough for the oyster to become fixed. When food is plentiful the oyster grows rapidly and assumes a convex shape on the left side and flat on the right. Shape determines market value. Under natural conditions young oysters fasten themselves in too great numbers on the same object, crowding and killing each other as they grow. Oysters feed on minute plants and animals (even their own young) in the water. Such plants are more abundant in shallow muddy water, so the best bottom is one that is firm enough for oysters to attach themselves but must also be near a muddy section, in water not too deep to be readily warmed in the sun. Too finely divided mud, or a moving sand bottom, overwhelms the tiny oyster, suffocating it. A rocky bottom is too deficient in food. The water must not be stagnant, must not be subject to frequent flood, which dislodges the oyster, and must not be too fresh. Too much ice discolors the oyster. So the muddy bottom must be saline and influenced by tides or current to aerate the water and bring in food.

Oysters have sex, reproducing like fish. The male sends milt into the water, the female, eggs. If the two genital fluids mix the eggs are fertilized, but since the oyster spawn over a long period (April-October) and as the oysters are often scattered widely over the natural beds and because there is no way of determining sex before spawning, there is great loss of eggs, for the two fluids do not meet at all or not soon enough.

The oyster has enemies both active and passive. The passive enemies are parasites which grow so rapidly as to engulf the oyster; or are other similar shell animals which eat all the oyster's food. The active enemies are boring worms which eat out the oyster's shell. Drills with their rasp tongues penetrate the shell and suck out the oyster. Drumfish, stingray, and worst of all, the star-fish eat oysters. The star-fish encircles the oyster and by muscular effort pulls the shells apart to eat the soft parts.

Man has helped the oyster by increasing the areas available for fixation by planting brush, tin cans, shells, bricks and pieces of pottery and sand in soft, muddy bottoms. By preventing crowding, breaking up clusters, many young are saved and allowed to grow into market shape. Seed oysters are planted at regular intervals over the bottom so as to assure a mixture of eggs and milt. Enemies are destroyed by fishing for them, dragging traps across the beds to catch them and by building stockades to keep the fish enemies away

XUM

from the beds. Food supply has been increased by propagating the small plants which constitute 90 per cent. of what the oysters eat. Finally legal provisions are made that prevent the taking of immature oysters from the beds, or the removal of more than the natural increment in any one year. By these means extermination is prevented and a supply sufficient for the always increasing demand is made. The threatened annihilation of the oyster is thus stayed.

As the fish along the Nile were wasted by the receding waters, so along the Mississippi after floods thousands of stranded fish formerly perished. To-day these fish are collected and put back in the river or sent to stock some other station. The same class of rescue work is carried on along canals that are drained in the fall of the year. Fish alien to our waters have been introduced here.

Stress has been laid on the work of the National Commission (now the Bureau of Fisheries) because its work has been the most comprehensive. Various State Commissions have carried on similar works for their own waters, meeting the problems peculiar to their State. The State and national bureaus are interdependent, aiding and supplementing each other. States having mutual waterways, such as New Jersey and Pennsylvania, New Jersey and New York, Pennsylvania and Ohio, consult each other as to fish legislation and aid each other in fish hatching and preservation.

The oyster, the cod, the shad, the salmon and the lobster, our valuable food fishes, would soon cease to exist if the work of artificial propagation and egg hatching were not carried on by the State and National Commissions.

The fish industry employs 150,000 men and the annual value of its products is over $50,000,000.* It is taken as an illustration of the attitude toward all resources, because it so well shows all the phases through which resources pass. In regard to some of our resources we are still in the first stage. Others we are wasting thoughtlessly. Toward many we are getting uneasy and preaching conservation, but in none except fisheries have we actually taken the last step and regenerated a resource that had been lost. For this reason, fisheries are here used to illustrate the whole field.

*Statistical Abstract U. S.

A GEOGRAPHIC STUDY OF THE MESA VERDE*

BY

WALLACE W. ATWOOD

About thirty-five miles southwest from the base of the San Juan Mountains and near the southwestern corner of Colorado there is a maturely dissected mesa, bordered by an abrupt escarpment, which rises from one thousand to two thousand feet above the adjoining lowland. The upland area is of sufficient elevation to receive an annual rainfall which will support a covering of grass and a scattering of scrubby cedars and piñons, and thus the name Mesa Verde, a green table, was long ago suggested.

The Origin of the Mesa Verde.—In origin the mesa is closely related to the geomorphic changes which have affected the San Juan region of southwestern Colorado, and the details in the outline of the mesa, in the bordering escarpments, and in the canyons which subdivide the mesa, are dependent upon local geologic conditions. The Mesa Verde is but a portion of a widespread plateau, which has been dissected by streams flowing southward and southwestward from the San Juan Mountains into the San Juan River, and thence to the Colorado. The mesa and plateau surfaces appear to be portions of a late Tertiary peneplain. That peneplain probably extended northeastward over a portion of the neighboring areas where now there are mountain ranges, and far to the southwest over the Colorado Plateau district. The relationship of the surface of the mesa to the San Juan Mountains is strongly suggested by a scattering of beautifully worn gravels, which must have come from the San Juan Mountains and travelled southwestward in stream courses long before the present valleys were developed. With the uplift which closed the cycle of erosion, when this broad area was reduced to a peneplain, the San Juan Mountain area rose as a dome and the surrounding area as a slightly inclined plain. The upper surface of the Mesa Verde slopes gently to the southwest. The streams were invigorated and the uplifted and deformed peneplain was dissected. The areas of softer rocks were first reduced and the remaining upland areas

* From *Annals of the Assoc. of Amer. Geographers*, Vol. 1, pp. 95–100, Plates VI–VIII.

were thus defined as relief features. These relief features have been slowly yielding to the agencies of weathering and stream erosion to the present time.

The Dissection of the Mesa.—A hard layer of sandstone has preserved portions of the Mesa Verde, and the weathering of soft underlying shales has maintained the precipitous marginal escarpment. On the north, east, and south are the valleys of the Rio Mancos and its tributaries. On the west is the Montezuma Valley. The smaller streams tributary to the Rio Mancos on the south side of the mesa have worked headward until, in some instances, they have reached the escarpments bordering the mesa on the north and northwest. These escarpments, in turn, have been gradually retreating southward as the soft shales have been worn away, and huge blocks of the hard, overlying sandstone have fallen. In those instances where the headward growth of the valleys has reached to the margin of the mesa, the upper ends of the valleys are being gradually cut off by the retreat of the marginal escarpment. The surface of the mesa is to-day, therefore, very little like a tableland, for the canyons, which have been cut into it have left but narrow strips of upland bordered on either side by the nearly vertical faces of the canyon wall. As there is little or no water on the mesa at present, it is more common to see the stream courses dry than to find flowing water in them. The heads of the canyons are box-like, and the waters enter them as cascades or falls. The extension of the canyons northward into the mesa must be by the under-cutting at the falls and the gradual recession of the falls up stream.

The Cliff Dwellers of the Mesa.—The mesa top suggested to certain primitive people who formerly lived in the southwestern portion of the United States, an easily protected site for their homes. The upland could be reached only at a few points, and at those points with great difficulty. The approach of unfriendly peoples could be watched from the rim of the mesa or from outlook points on the rims of the canyons, and attempts made to scale the bordering escarpments or approach the homes through the canyons from the south could be anticipated by the dwellers on the mesa or by those in the great alcoves near the heads of the canyons. These people became the Cliff Dwellers. They built some of their homes and many watch towers on the remnants of the upland surface of the mesa, but most of their houses were built in the canyon walls. The ruins of these homes may still be found to the number of several hundred, scattered about through the area now set aside as the

Mesa Verde National Park and southward over the remaining portion of the Mesa Verde. The more remarkable of the buildings are near the heads of certain of the canyons which end just south of the southern limit of the Park. The Park authorities, however, by an act of Congress, have been given control over this region of unusual dwellings which added to the territory under their jurisdiction a bordering strip five miles in width. The alcoves which were selected for homes were worn out of the canyon walls by the agents of weathering at less resistant points in the sandstones. The dwellings are not in the underlying soft shales, but near the bedding plane between two of the great sandstone layers which form the capping of the mesa. The overhanging ledge sometimes extends as much as one hundred feet beyond the inner margin of the cave in which the home was built.

The Character of the Houses.—Fragments of the sandstone, after some little trimming and shaping, were used by these peoples in the construction of their homes and laid one upon the other with mortar or plaster made of the underlying clay. The homes were built from the floor of the cave to the ceiling. In some instances there are three, and in a few instances even four stories. The floors were made by placing cedar boughs from wall to wall. These cedar boughs were usually allowed to protrude beyond the walls and sometimes served as a support for platforms or balconies. The rooms are usually not more than eight or ten feet in diameter and many of them are much less than that. Many of them are without light from the outside. The dark rooms have been interpreted as granaries or storage rooms.

A few of the inner rooms in which human bones, and in some instances mummies have been found, have been interpreted as burial rooms, and it is believed that these people, after embalming their dead, stored them away in the inner recesses of their great dwellings. Among the rooms in the dwellings there are certain circular ones which have been called kivas, and these have been interpreted as ceremonial rooms. These rooms were covered over and entered from above by ladders, or through subterranean passageways. The kivas had cold air flues for ventilation, an altar, a large central fireplace, small niches in which the sacred grain was stored, and a little off the center a small circular opening about eight inches deep and four inches in diameter, which has been interpreted as a connection with the under-world which might be used when desired by those conducting the sacred services. The ceremonial rooms were some-

XUM

times rectangular; they were always well made and exceedingly strong. There were several such kivas in each dwelling and they were always in the outer portion or foreground of the little village.

The Products and Implements of the Cliff Dwellers.—Almost every room in the dwellings has been blackened by the soot which came from the fires used for heating or cooking. There were open fireplaces in which the people prepared their simple foods and about which they may have baked certain of the pieces of pottery. Scattered about in the rooms and in the large open space back of the rooms, where the caves have but little height, there are thousands and thousands of corncobs. Great heaps of corncobs have been found by those who have been engaged in repairing the dwellings. The corncobs were small, about the size of pop corn cobs, and it is of special interest to learn that these people raised maize in this region where now there is but one spring known, and where it would be impossible to raise grain without some elaborate method of storing the rainfall and using it through the dry season by means of irrigation ditches.

From the few relics found about the dwellings it is evident that cotton also was raised. Some game was killed, and both the cotton and the skins of animals were used for clothing. The leaves of the corn, and the leaves and cords of the yucca served in the making of sandals. The abundance of plastic clays and the necessity of vessels for carrying water led these people to be good pottery makers, and among the dwellings to-day there are many bits of ancient pottery. Occasionally a bowl or a spoon or a cup is found in the débris.

The corn was ground in large bowl-shaped stones, hollowed out for that purpose. Many of the grinding stones and bowls are still in good condition and are now preserved for the inspection of visitors. About the ruins little flint arrow-heads, used presumably for shooting small game, may be found, and at many places on the upland areas of the mesa similar arrow-heads have been picked up. Stone axes and stone knives have also been found, but no implements of metal. The Cliff Dwellers, used the grasses and leaves of the yucca, the leaves of the corn, the twigs from the willows, cedar boughs and trunks, stones, clay, cotton and the skins of wild animals. They presumably lived in peace and in an exceedingly simple way.

The Cliff Palace.—In the largest of the dwellings, the Cliff Palace, there are over 300 rooms. A great circular tower occupies the central position in the dwelling, and at one end is a rectangular tower, four stories high, interpreted as the home of the chief. Over

twenty kivas border this dwelling in the foreground, and behind the rooms which were closed in there is a large open space which may have been used as a playground for children or a safe retreat during an attack, or as general storage space.

Near each dwelling on the mesa there must have been a spring. There are indications that many such springs did exist. The one which is now flowing is near the head of one of the forks of the Navajo Canyon, where the Spruce Tree House is located. The dwellings at the Spruce Tree House and Cliff Palace have been somewhat repaired by representatives of the Smithsonian Institution, but this work has been so well done that the homes still appear as ruins. The débris has been cleared away and a much better idea of these ancient homes can now be obtained than before this work was done. There remain several of the dwellings which are almost inaccessible or unsafe to visit until some work of repair shall have been done.

The Geographic Conditions at the Time of Occupation by the Cliff Dwellers.—The origin of the mesa is seen to have been closely associated with the physiographic history of the region. Its form and the details in its architecture are due to the controlling geologic conditions. Its isolation made it attractive to a peaceful people who wished a quiet home out of the reach of unfriendly nomadic tribes. The alcoves which the Cliff Dwellers selected for their homes were due to the differential weathering of the varying formations of the mesa. The stones used in building homes were obtained from the formation immediately at hand; the clay used as mortar immediately underlay the sandstone. The scarcity of water determined the location of the homes near the springs, and compelled the people to conserve the water supply. The necessity for carrying and conserving their water supply led these people to make various kinds of water vessels and to become good pottery makers. The scarcity of level land made it necessary to cultivate small portions on the upland and on the canyon bottoms. The aridity of the climate made the food supply a difficult question for these people. The corn which they raised was small and stunted. The wild game was presumably small and scarce. Cotton was raised in but relatively small quantities.

The Present Conditions.—Since the Cliff Dwellers inhabited the Mesa Verde, the climate has evidently become even more arid, and the mesa could not to-day support the population which it must once have supported. The single spring would limit the inhabitants to one or at most two of the hundreds of dwellings scattered about

XUM

on the mesa and in the canyons. The almost complete absence of wild game on the mesa would add to the difficulties.

The Age of the Ruins.—The lack of definite legends, among the Indian tribes of the Southwest of their relationship to these ancient Cliff Dwellers seems to indicate that these homes were deserted many hundreds of years ago, and the absence of any metals about the homes suggests the same conclusion. The relationship of this entire record to the geologic history suggests that the Cliff Dwellers inhabited this region at a time much less removed than the present from the last period of glaciation in the mountains, and the question may perhaps be raised, may we not find some evidence in the homes of these ancient peoples that will indicate that they inhabited portions of our Southwest country during the last glacial epoch in North America?

STUDIES ON CLIMATE AND CROPS*

3. The "Solar Constant" and the Variations of Atmospheric Temperature at Arequipa and some other Stations

BY

HENRYK ARCTOWSKI

At my request, Prof. E. C. Pickering kindly let me utilize for my researches on Climate and Crops the not yet published observations made at Arequipa during the years 1900-1910. As these observations interest meteorologists greatly (South American data being very scarce and not easily obtainable), I shall begin this paper by a summary of the results of my calculations.

The Arequipa station has been described previously in the *Annals* of Harvard Observatory.† The installation of the thermometers has undergone no change during the eleven years taken into consideration. The instruments were observed at 8 A. M., 2 and 8 P. M. The daily maxima and minima were also recorded. Some gaps occurring here and there were not important enough to affect the averages, except in the case of the 2 o'clock observation during the month of March 1908. The adopted value 64°.1 is therefore more or less hypothetical. The daily minima are also lacking from April 8th, 1909, till March 7th, 1910.

The lowest temperature, 36° F., was recorded in Aug. 1908 and the highest, 78° F., in June 1910.

The annual maxima are 74° or 75°, except in 1909 and 1910, when they were 76° and 78°. The lowest maximum recorded is 68° (Jan. 1904). This small

* Paper 1 in this series appeared in *The Bulletin*, Vol. 42, 1910, pp. 270–282; Paper 2 in the same volume, pp. 481–495.

† *Annals of the Astronomical Observatory of Harvard College*, Vol. 39. Cambridge, Mass., 1899.

difference, of only 10° between the extreme values of monthly maxima, explains why the annual maximum may occur at any time of the year. The highest yearly minimum, 42°, was observed in 1901.

Table 1 gives the mean maxima and minima and also their differences for each year.

TABLE 1.

YEAR	MEAN MAX.	MEAN MIN.	DIFF.	FEB'Y	JULY
1900....	68.73	49.59	19.14	16.6	19.0
1901....	68.20	48.90	19.30	18.1	19.5
1902....	68.06	49.02	19.04	16.7	19.3
1903....	67.52	47.88	19.64	18.9	19.1
1904....	67.02	47.20	19.82	19.7	20.1
1905....	68.18	48.45	19.73	20.0	19.6
1906....	67.73	47.97	19.76	19.4	19.5
1907....	66.76	48.69	18.07	14.9	18.3
1908....	67.06	48.27	18.79	16.5	19.3
1909....	66.80	....			
1910...	66.46	....			
Mean differences =			19.25	17.9	19.3

TABLE 2.

YEAR	8 A. M.	2 P. M.	8 P. M.	DIFF. 1	DIFF. 2
1900....	60.10	66.66	54.02	6.56	12.64
1901....	59.57	66.28	53.45	6.71	12.83
1902....	59.34	66.36	53.53	7.02	12.83
1903....	59.31	65.57	52.92	6.26	12.65
1904....	58.53	65.52	52.03	6.99	13.49
1905....	59.62	66.38	53.33	6.76	13.05
1906....	59.03	66.09	52.71	7.06	13.38
1907....	58.38	64.71	52.86	6.33	11.85
1908....	58.78	65.00	52.79	6.22	12.21
1909....	58.32	65.17	51.87	6.85	13.30
1910....	58.09	64.28	52.32	6.19	11.96
Mean	59.01	65.64	52.89		

The mean difference, 19°.25, expresses the range of the daily variation slightly exaggerated.

More information on the daily variation can be obtained from Table 2, which gives the mean temperatures for the hours 8 A. M., 2 and 8 P. M.

I give these figures for each year as it is interesting to compare the differences 2 P. M.–8 A. M. (Diff. 1) and 2 P. M.–8 P. M. (Diff. 2) from year to year, with those of other stations as I have done in the case of Russian data.*

Table 3 contains the monthly means, which have been calculated according to the formula $(8+2+8+8) \div 4$, to make them correspond to those of the maxima and minima.

TABLE 3.

STATION—AREQUIPA. DATA—MEAN TEMPERATURES.

YEAR	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	MEAN
1900.....	58.5	59.3	60.2	59.6	57.7	57.3	56.0	58.4	58.8	59.4	59.5	59.6	58 69
1901.....	59.1	59.4	58.0	58.7	58.1	55.9	56.0	58.3	59.4	58.4	57.8	59.0	58.17
1902.....	58.3	57.5	57.7	58.5	58.2	56.0	57.6	57.6	58.8	58.9	59 2	59.7	58.17
1903.....	60.4	61.8	58.7	57.2	56.8	55.5	56.3	56.0	58.6	58.2	56.3	56.6	57.70
1904.....	57.0	57.2	56.3	57.2	55.6	56.0	55.0	57.3	57.9	57.5	58.8	58.4	57.02
1905.....	58.2	59.5	57.0	58.2	58.1	57.8	56.9	57.7	58.0	59.6	58.7	58.2	58.16
1906.....	59.1	58.8	58.9	59.2	57.7	55.0	55.2	56.6	58.7	57.1	58.3	56.7	57.61
1907.....	56.3	55.4	58.1	56.6	57.1	56.3	55.8	57.0	58.3	58.1	58.6	58.5	57.17
1908.....	58.5	57.4	(58.1)	58.2	57.5	56.8	55.5	58.3	57.5	56.9	57.9	57.4	57.50
1909.....	57.2	56.4	58.7	56.7	54.7	54.1	55.8	56.2	58.7	58.0	57.3	57.5	56.77
Mean	58.26	58.27	58.17	58.01	57.15	56.07	56.01	57.34	58.47	58.21	58.24	58.16	57.70
1910.....	55.8	56.1	55.2	57.6	56.3	56.5	55.4	56.7	58.0	57.2	58.5	57.5	56.73

The mean yearly variation is characteristic: From Sept. till April a temperature slightly above 58° F., June and July approximately 56°. An amplitude of only 2°.4.

* * *

In my former researches on the variations of the annual means of temperature† I showed that the changes in the geographical distribution of excess or deficit temperatures—the annual pleions and antipleions—must be due to changes of solar activity.

* "Notice sur les variations de longue durée des amplitudes moyennes de la marche diurne de la temperature en Russie (*Bull. Soc. Belge d'Astronomie, 1908*)."

† "L'enchaînement des variations climatiques." Bruxelles, 1909.

XUM

Moreover, having utilized all available data, for the years 1891 to 1900, I found a predominance of antipleions for 1893 and for 1900, on the contrary, pleions occupying extensive areas.

In 1900 the temperature at the earth's surface must have been at least 0°.5 C. higher than in 1893, a year of maximum of sunspots. Later, the extensive actinometrical observations of Gorczynski,* showing the depression of the solar activity during the year 1903, attracted my attention to the meteorological phenomena of that year. I therefore collected monthly and annual means of temperature, for as many stations as I could, with the intention of discussing the maps, for the decade of years 1900 to 1909, with special reference to the year 1903. But this discussion needed an introduction.

In 1903 Europe was covered by a thermopleion having its center in Russia where the temperatures were 1°.5 C. above the ten years mean. In 1902 and 1904, on the contrary, the temperatures were below the averages. The European pleion of 1903, this wave of excess of heat during a year of diminution of solar radiation, seems abnormal. But it is only a typical example of the complicated effect due to temporary diminution of the quantity of energy radiated from the sun to the earth.

Regional temperatures depend on the direction of prevailing winds, the winds depend on the distribution of atmospheric pressure, the abnormalities of atmospheric pressure depend to a great extent on the distribution of the differences in temperatures and therefore on the geographical distribution of land and sea, of clouds, ice, dust, rocks and vegetation. And to foresee, theoretically, the effects of a given variation of the "solar constant" on the general circulation of the earth's atmosphere and on the local changes in the distribution of temperature is, in the present state of our knowledge, an absolute impossibility.

To approach the simpler problem of the European pleion of 1903, I thought best to begin with the study of the mode of formation of pleions in less disturbed areas, leaving entirely aside, for the present, the dynamical problem of their mode of propagation.

The meteorological records of Arequipa, in Peru, of Bulawayo, in Rhodesia, and of Batavia, in Java, ought to give, it seemed to me, some good information on the origin of pleions.

I added Mauritius, Hawaii and Porto Rico to have records of tropical islands in the Indian, Pacific and Atlantic oceans. The other stations which I took into consideration, for the sake of comparison, are: Colombo (Ceylon), Bombay, Hong Kong, Tananarive (Madagascar), Capetown, Havana, Montevideo and Adelaide.†

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* Ladislas Gorczynski: "Quelques renseignements sur la dépression du rayonnement solaire à Varsovie en 1903." (*Bull. Mét. du département de l'Hérault.* Montpellier, 1906.)

† The figures for Capetown, Mauritius, Bombay, Colombo and Adelaide were obtained from the mean maxima and minima published in *Symon's Monthly Magazine.*

The data for Bulawayo were sent to me by the Rev. E. Goetz, who attracted my attention to the fact that in July, 1903, the thermometers were moved from a small Stevenson screen into a screen of about 12 cubic feet.

I received the data for Hong Kong from F. G. Figg, Director of the Hong Kong Observatory, and those of Batavia from Prof. Van Bemmelen, Director of the Observatory.

The means for Tananarive were taken from the "Observations météorologiques faites à Tananarive."

The data for Havana and Montevideo were sent to me by the Directors of the Colegio de Belen and the Colegio Pio de Villa Colon.

The meteorological stations of Hawaii and Porto Rico are those of the Weather Bureau of the U. S. Dept. of Agriculture. The data for these stations were kindly sent to me by the section Directors Wm. B. Stockman and Oliver L. Fassig.

I thank most sincerely all of these gentlemen who, by sending me these data, have helped me in my work.

TABLE 4.

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	MEAN
Arequipa	58.7	58.2	58.2	57.7	57.0	58.2	57.6	57.2	57.5	56.8	56.7	57.6
Bulawayo	(68.3)	(67.2)	(67.3)	(67.4)	65.5	66.9	65.5	64.7	66.5	65.7	65.0	....
Batavia	79.5	79.2	79.5	79.3	78.4	79.7	79.7	78.8	79.2	79.2	....	79.2
Mauritius	74.0	74.3	74.9	73.9	73.2	74.1	73.7	73.6	74.1	73.5	....	73.9
Honolulu (Hawaii)	74.5	74.4	73.9	72.1	73.8	72.9	74.1	73.8	73.1	....	....	73.7
San Juan (Porto Rico)	78.5	78.9	78.3	78.8	77.7	78.4	78.2	77.7	78.5	77.8	77.6	78.2
Colombo	82.3	82.0	81.4	81.5	80.6	81.5	81.6	81.0	81.2	81.0	....	81.4
Bombay	80.8	80.8	81.9	79.8	81.1	80.2	80.4	81.2	80.3	80.2	....	80.7
Hongkong	71.6	72.1	73.4	71.5	71.6	71.6	71.8	72.2	71.8	72.7	....	72.0
Tananarive (Madagascar)	66.0	65.5	67.1	66.0	66.0	66.6	66.2	66.0	66.7	66.0	....	66.2
Capetown	62.6	62.5	62.5	61.0	61.6	62.1	61.5	61.8	61.4	62.0	....	62.0
Habana	77.0	76.1	76.8	76.6	76.5	77.4	76.1	76.5	76.3	76.3	....	76.6
Villa Colon (Uruguay)	63.3	62.2	62.6	62.8	62.1	60.8	62.4	61.5	61.5	61.5	....	62.1
Adelaide	62.8	63.5	63.4	61.9	62.9	62.3	63.7	62.3	63.0	60.9	....	62.7

I made the consecutive totals of the monthly means of temperature for these fourteen stations and it is the diagrams showing the variation of these figures that I shall compare.

Some of these diagrams (Batavia, Montevideo, Havana and Tananarive) derive from totals of °C. and have apparently smaller amplitudes of variations. I reproduce in Table 4 the annual means of all stations expressed in °F., the corresponding points on the curves being marked by vertical lines.

Let us examine the curve of Arequipa first. The 132 figures utilized to trace

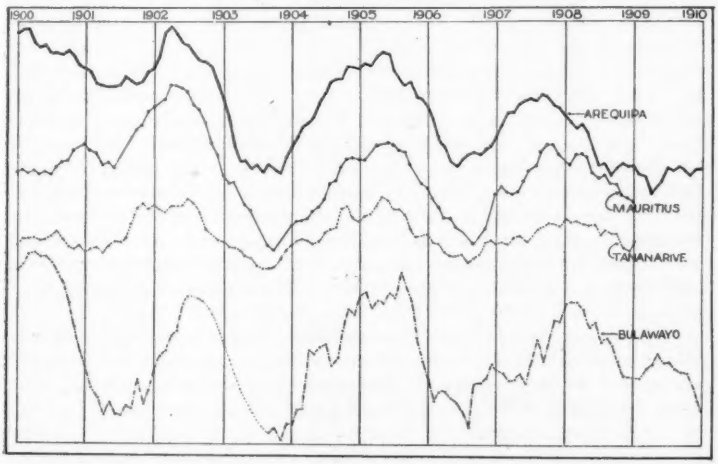

FIG. 1.

this curve (Fig. 1), being all totals of the means of twelve consecutive months, are all equivalent to yearly values. The yearly variation being therefore completely eliminated, the ups and downs of this curve are due to temporary deficit or excess of temperature independently of the moment of the year when they occurred and independently of the duration of the occurred anomaly,—the anomaly itself being expressed at the right moment when its cumulative effect on the annual mean was greatest.

The curve of Arequipa shows us three characteristic crests and four depressions. The mean temperature corresponding to the crest April 1902 to May 1903 is 58.8. The mean temperature corresponding to the depression Nov. 1903 to Oct. 1904 is 56°.7. A diminution of 2°.1 of temperature; nearly as much as the mean annual variation.*

Then the temperature rises to the crest of May 1905 to April 1906 with a value of 58°.4. The distance between the two crests is three years and one month. The following crest is nearer, the distance being only two years and four months. The distances of the depressions are also smaller than three years and they are nearly equal, the figures being thirty, thirty-one and thirty-four months.

There can be no doubt that these oscillations of temperature correspond to those of atmospheric pressure for which Lockyer† assigned a mean period of 3.8 years and which were studied for the first time by Sir John Eliot.‡

A curve of the consecutive means showing this periodicity for the temperatures observed in Batavia was published by me in Oct. 1909.§

The same curve, together with the curve of consecutive means of atmospheric pressure, was published in March 1910 by C. Braak.‖

The correspondence of these two curves is remarkable, also the variations of atmospheric pressure are in advance of those of temperature.

To return now to the question of the formation of pleions, we see that the mean temperature of Arequipa corresponding to the first crest is 1°.1 above and that of the second crest 0°.7 above the mean of the decade 1900–1909, while the departure of the depression is — 1° F.

Instead of these extreme values the departures of the yearly means of 1902, 1903, 1904 and 1905 would have been utilized to draw the maps. The figures are +0.5, 0, —0.7 and +0.5. The map of 1902 (if such a map could be drawn for Peru) would give us the pleion before its maximal development, that of 1904 the antipleion shortly after its maximal development. It is clear, therefore, that with the maps, curves of consecutive means must be utilized and that the crests are the pleions of the maps and the depressions of the curves are the anti-pleions. It is clear also that in the tropical regions pleions must be formed more or less regularly (independently of the atmospheric circulation) under the sole influence of variations of solar activity. This statement needs some words of explanation.

The sunspots, the faculæ, the prominences are manifestations of solar activity, but the only variations which directly interest the temperature of our atmosphere are those of the "solar constant." Now, these variations are more or less problematical. It is probable that such solar manifestations as the prominences and the sunspots are connected with variations of the "solar constant," but this has not yet been proven. It is therefore most interesting to notice that the temper-

*Or even more than the range of annual variation since, according to the calculations of P. Schreiber, an amplitude obtained by the method of consecutive means (eliminating the annual period) is but 83% of its real value.

†"A Discussion of Australian Meteorology," London, 1909, and other publications.

‡"A preliminary discussion of certain oscillatory changes of pressure of long period and of short period in India." *Indian Meteorological Memoirs*, v. 6, pt. 2, 1895.

§"L'Enchaînement des variations climatiques," p. 32.

‖*Meteorologische Zeitschrift*, 1910, p. 121. (Translated from *Naturk. Tijdschrift* and signed: Batavia, Oct., 1909.)

atures observed at Arequipa show some precise correlations with the values of the "solar constant" measured at the observatory of the Smithsonian Institution.*

In the following diagram (Fig. 2) I reproduce the forty-four values obtained for the "solar constant" from observations made in Washington at different dates

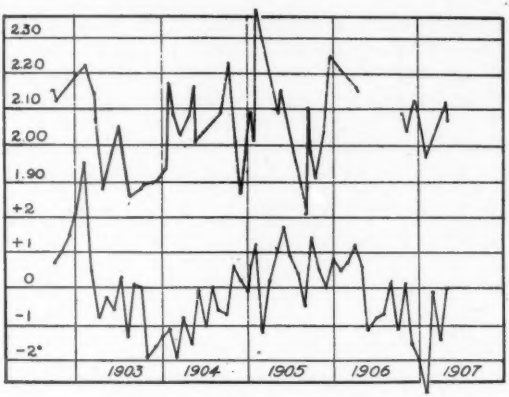

FIG. 2.

between Oct. 9, 1902, and May 14th, 1907,† and below, I have drawn the curve of the monthly departures obtainable from Table 3. It is obvious that the number of observations of the "solar constant" is insufficient to show all the details of the variation. Moreover, some measurements may have been taken precisely on exceptional days, giving values which would not have very greatly influenced results of continuous records. Special meteorological conditions may also have influenced the obtained figures.

But, taking the uncertainty of the results into account, it is astonishing to see such a close agreement between the two curves as that which is exhibited. Supposing that the fluctuations of the "solar constant" and those of the monthly means of temperature observed at Arequipa coincide, which is far from being certain, as the diagram shows that a delay is more probable, I compared the Mount Wilson measurements with the Arequipa monthly departures of temperature. To have comparable figures I made monthly means of the 121 observations taken at Mount Wilson from June to Oct. 1905 and from May to Oct. 1906.‡

The differences between these figures, compared with the differences between the departures of the corresponding months, led me to the supposition that a departure in temperature of 1° F., in a monthly mean observed at Arequipa, is due to a departure of about 0.015 of the "solar constant" from its normal value. If this is the case, we may admit that a comparably small lowering of the "solar constant," if permanent, could produce climatical changes such as those which

* C. G. Abbot and F. E. Fowle: *Annals of the Astrophysical Observatory of the Smithsonian Institution*, Vol. II. Washington, 1908.

† *Loc. cit.*, p. 98. ‡ *Loc. cit.*, pp. 96–97.

XUM

have really existed during the pleistocene ice age. The required diminution would indeed fall entirely within the range of the momentary changes observed at Mount Wilson, the extreme values being 1.93 and 2.14 calories. But it is useless to make more far-reaching speculations, the acquired facts being sufficient to show the cause of the formation of pleions in tropical regions.

Considering once more the curve of consecutive means for Arequipa, we notice its striking descent from 1900 till 1909. The pleionian crests could in turn be eliminated by calculating consecutive means of groups of twelve monthly consecutive means. This method has been recently applied, with great success by Axel Wallen in the study of the variation of the level of the Swedish lake Vaener.*

The purpose of my paper being restricted to the question of the origin of tropical thermopleions, I will leave aside the interesting conclusions obtainable

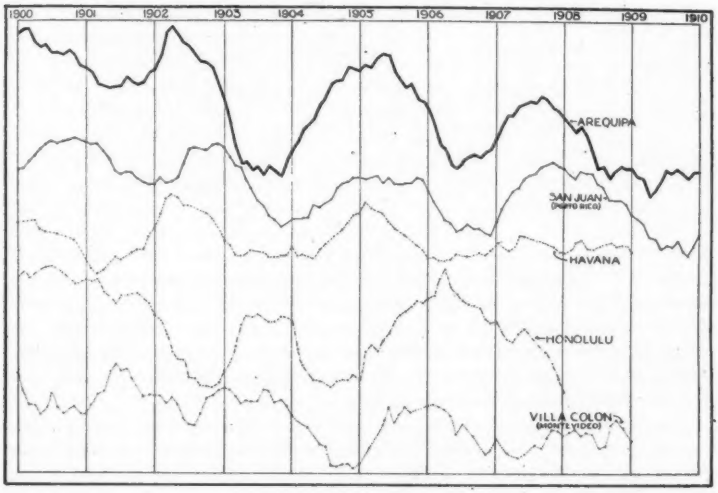

FIG. 3.

from the comparison of the rise or fall of curves in which the crests and depressions of short periodicity would be eliminated. Thus these deductions having been derived from the study of the records of Arequipa the question arises whether they are exceptional. They are not.

The diagram (Fig. 1) shows besides the curve of Arequipa those of Mauritius, Tananarive and Bulawayo.† The curve of Mauritius is more characteristic than that of Arequipa, the crests being more regular in shape. The amplitudes also are slightly more pronounced. But the ups and downs are practically simultaneous, and even certain small details of one curve may be observed in the other. For Tananarive the difference between the first depression and the ad-

* *Meddelanden från hydrografiska byrån.* 1. Stockholm, 1910.

† For Bulawayo I omitted the totals corresponding to the change of installation of the thermometers and shifted the curve of 1900–1902 downwards.

jacent crest is 1° C.=1°.8 F., that is to say, nearly of the same magnitude as in Arequipa. In Bulawayo the difference between the depression of 1904 and the crest of 1905 is 2°.6, therefore 0°.5 F. higher than in Arequipa. If we take into consideration the fact that Bulawayo has an absolutely continental but tropical climate and that the climate of Mauritius is oceanic, it is astonishing to see how similar the curves are.

Diagram 3 reproduces the curves of Porto Rico, Havana, Hawaii and Montevideo, together with that of Arequipa, to make the comparison easier. The identity of the curves of Porto Rico and Arequipa is striking. In Porto Rico the amplitudes are smaller. In the case of the cited crest we have only a difference of 1°.2 F. And then the most interesting fact is that the curve seems to have been shifted to the right, in other words the same variations occur in Porto Rico a few months later than in Mauritius, Bulawayo or Arequipa. The tropical pleions have to travel towards Porto Rico, they do not originate there. The

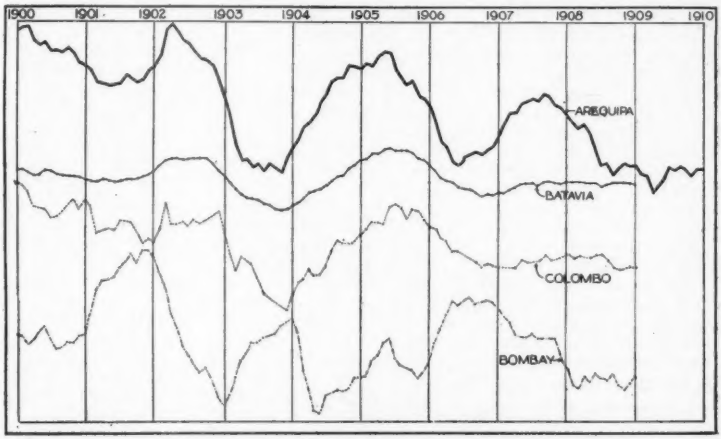

FIG. 4.

curve of Havana is an ascending curve. This is perhaps why the depressions are flat. The crests occur sooner than in Porto Rico, being simultaneous with those of Arequipa; but the variation is far from being as characteristic as in Arequipa.

Hawaii, in the same latitude as Porto Rico, shows a totally different variation. The curve is inverted. This may be due to an increase or decrease of the trade winds due to a stronger or feebler appeal from the equator. I will leave this question without an answer simply because it would require a special investigation for which I do not possess at present the necessary material of meteorological observations. The curve of Montevideo is still more irregular than that of Honolulu and must, therefore, also be left aside.

Diagram 4 shows the similarity of the variations at Colombo and Batavia. Both curves belong to the type of Arequipa, but they are far from being as perfect illustrations of the solar action. They are, indeed, to a certain extent tran-

XUM

sitional forms between the curve of Arequipa and the curve of Bombay, which is of the opposite type. If this curve is shifted towards the left, the correspondence of the crests of Arequipa with the depressions of Bombay is very well marked. However, the character of the opposition is more complicated than in the case of Honolulu, because small crests appear in the depressions, just where they ought to be if slightly retarded, as in the case of San Juan. Another interesting peculiarity is shown on the curves of Batavia and Colombo. The crest of 1902-1903 is flat at the first and depressed at the second station. We see now how a change of temperature in one region influences those occurring simul-

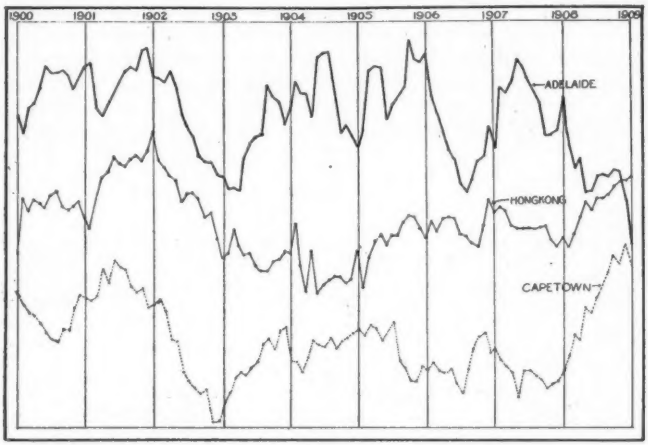

FIG. 5.

taneously in another region. The curves of Cape Town, Adelaide and Hong Kong illustrate this fact. Here nothing or nearly nothing is left of the simply solar variation of Arequipa or Mauritius, Bulawayo and other stations.

In temperate regions the rise and fall of the "solar constant" seem not to affect the temperature of the atmosphere. But this is impossible; and indeed there the climatical changes are more important than under the equator. The reasons why are still to be found. In my "Enchaînements"* I said that the maps of yearly departures for Russia demonstrate the fact that Europe must be considered as a region of travelling pleions, showing the probability of interferences of climatical waves coming from two or more centers of origin. The maps for North America also demonstrate this fact, but those of Australia are very much simpler. The variations of the "solar constant" which have such a marked effect on the temperature of the tropical regions must have an even greater effect on the temperature of the polar regions. At the pole the sun shines continuously during half a year. In the case of the inland ice of Greenland we may therefore expect an important reaction on the Islandic "center of action" of the North Atlantic atmospheric circulation. In the case of the antarctic ice cap, the effect on the sub-antarctic cyclonic system must even be greater.

Dobbs Ferry, N. Y., May 25, 1912.

* P. 131.

GEOGRAPHICAL RECORD

NORTH AMERICA

TOPOGRAPHICAL MAPS OF COUNTIES. A demand has appeared for government topographic maps by county units. The U. S. Geological Survey has accordingly decided to try the experiment of publishing such maps. The first county map, which has just been issued, is of Jefferson Co., Ky. The area was surveyed in cooperation with the Kentucky Geological Survey, the State and the Federal surveys each contributing to the cost of the field work. Jefferson is one of the most irregularly shaped counties in the State and includes portions of the areas shown on the Geological Survey's Kosmosdale, New Albany, Prospect, Louisville, Taylorsville, and La Grange topographic atlas sheets. The map shows most of the county as rolling, although the southwestern portion is almost mountainous. This county map is believed by officials of the Survey to be the most finished and perfect example of a county map which has been published in the United States. The scale is 1:62,500, or approximately 1 mile to an inch, and the contour interval is 20 feet. The map is sold at twenty cents a copy.

THE UNITED STATES-CANADA SURVEY. During the summer of 1911 the joint commission appointed and authorized by the Governments of Canada and the United States to locate and mark the boundary line separating British territory from Alaska advanced field operations northward along that part of the 141st meridian which extends from the Porcupine River to the Arctic Ocean. This work was a direct continuation of the boundary survey that was carried northward from Yukon River to the Porcupine River during the summers of 1909 and 1910. The commission expects to complete this part of the survey in 1912.

The 320 miles through which the 141st meridian extends between the Yukon River and the Arctic Ocean is crossed about midway by the Porcupine River, which thus separates the region into north and south subdivisions that form convenient units for geographic and geologic description. The southern subdivision, about 175 miles in length, may be designated as the Yukon-Porcupine section, and the northern one, about 145 miles in length, the Porcupine-Arctic section.

The Porcupine River is easily navigated by shallow-draft steamboats to New Rampart, an Indian trading settlement on the north bank of the river just east of the boundary line, or about 225 miles above its confluence with the Yukon near Fort Yukon. It thus affords a natural route for the transportation of supplies and makes it practicable to maintain a very convenient base of operations for both sections of the boundary at this point.

At the close of the field season of 1910 there still remained in the northern half of the Yukon-Porcupine section a stretch of about eighty miles south from the Porcupine, the final work of permanently placing the intermediate monuments at intervals of three to five miles and of clearing a strip forty feet wide through the timbered portions along the line. There also remained the topographic mapping of a strip two miles wide on each side of the line for about forty-five miles south from the Porcupine. Of this work the mapping was completed to the Porcupine in July, 1911, but, owing to unforeseen delays, the setting of the monuments and clearing through timber lacked thirty miles of reaching the Porcupine. This work will be completed in 1912.

In the meantime field work was commenced on the Porcupine-Arctic section at New Rampart in June, 1911, and continued northward until the middle of August. The 141st meridian was located to a point within seven miles of the Arctic Ocean. The topographic mapping of the four-mile strip along the line was completed for about 115 miles, or within about thirty miles of the Arctic coast. The boundary was marked with permanent bronze monuments at intervals of four or five miles over approximately seventy miles, or about half the length of the section north from the Porcupine, and the strip forty feet wide was cleared through such timbered portions as occurred in this distance. (*Bull. 520 K, U. S. Geol. Surv., 1912, pp. 3-4*)

EFFECTS OF FORESTS UPON STREAM FLOW. That the forest cover of the White Mountains has a distinct effect upon the navigable streams which head in that

XUM

region is the statement of the United States Geological Survey. The Director of the Survey has filed his preliminary report on the White Mountains with the National Forest Reservation Commission, and the findings are favorable to the purchase of lands under the Weeks law. The hydrometric showing presented in the preliminary report covers results on two small, almost exactly similar drainage basins of about five square miles each, on the east branch of the Pemigewasset River, one largely clothed with virgin timber and the other deforested and burned. Measurements of precipitation over the areas and of the run-off of the respective streams show that not only was the snow held better in the forested area, but that during a period of seventeen days in April, including three extended storms, the run-off of the stream in the deforested area was a comparative flood—practically double that of the stream flowing through the forested area.

THE GEOGRAPHIC SOCIETY OF WISCONSIN. This Society has been organized under the presidency of Mr. J. A. Merrill of Superior. Its members are teachers of geography. An annual meeting will be held in conjunction with the State Teachers' Association. The programme will consist of papers on professional subjects and reports of work done in various sections. Models and maps made by members will be shown. It is expected also, if the members approve of the plan, that each member shall select a special topic for investigation and report his results to the Society. Each member will make a report on his work at least every other year. It will consist largely of personal investigations of the region near his home, or some research topic in which he is specially interested. These reports are to be duplicated and sent to each member of the Society. It is also planned to organize auxiliary societies to be called Outing Clubs, composed of students and teachers, for the purpose of studying the local surroundings and becoming acquainted with the geography of the home district. This work will not only include geography, but nature study and biology also, as far as these subjects may interest students in the high school, normal school or college. The Outing Clubs are to be affiliated with the State Geographical Society and are to report to its secretary once a year. The secretary is to make duplicates of the reports and send them to presidents of the different Outing Clubs, so that each part of the State may become acquainted through this vigorous first hand touch with the other regions of Wisconsin.

CANADA'S ENLARGED PROVINCES. In March last the Canadian parliament enlarged the provinces of Quebec, Ontario and Manitoba. The area of Quebec was increased from 351,873 to 706,834 square miles; Ontario from 260,862 to 407,262 square miles; Manitoba from 73,732 to 251,832 square miles. The areas thus added are capable of considerable development, their progress will be stimulated by their incorporation in strong provincial governments and they will be of great benefit to the developed regions with which they are now politically united.

Quebec now possesses the whole of the wide Labrador Peninsula from the Gulf of St. Lawrence to Hudson Strait, with the exception of the Atlantic coastal strip which belongs to Newfoundland. She already possessed the southern part of Labrador bordering on the Gulf of St. Lawrence whose extensive forests are now the field of a large pulp wood industry and whose large potentialities in the form of water power will some day be utilized. There are large resources in the northern region now acquired, in forests, fisheries, etc.

The northern boundary of Ontario, formerly following the Albany river in the west, now follows the west coast of Hudson Bay to a little south of Port Nelson, from which a straight line extending S. W. forms the new boundary between Ontario and Manitoba.

Two-thirds of Keewatin is now included in the new Manitoba, which thus controls the entire territory through which the proposed Hudson Bay R.R. is expected to carry much of the wheat of the western provinces to Europe by the new land and water route whose development has now been taken in hand.

RADFORD IN THE CANADIAN BARREN GROUNDS. The Society has received a letter from Harry V. Radford, M.Sc., C.E., dated Dec. 10, 1911, at the igloo of Chief Akulak, Inland Eskimo winter encampment, at the head of Schultz Lake, lower Thelon River, 64°40′ N. 98°27′ W. The ton of supplies purchased for him by the Arctic Club of New York reached him at the mouth of Chesterfield

XUM

Inlet in September last, where they were landed by the *Pelican* of the Hudson Bay Company. That company loaned Mr. Radford a small schooner, the *Chipman,* which took him, Mr. Street and three Eskimos with the supplies up Chesterfield Inlet and to the head of Baker Lake. He says that the Inlet may be safely ascended by steamers drawing at least fifteen feet and that smaller vessels can ascend the twenty-five-mile river and reach the head of Baker Lake without difficulty. Baker Lake is an immense inland harbor nearly sixty miles long.

He landed in Chipman Cove, on Oct. 13, where the schooner was beset with ice in a few hours. He sent his Eskimos to the head of Schultz Lake to borrow a sledge and dogs, and on Nov. 13 the party, with about half of their supplies, reached the Eskimo encampment, where they found thirty-two Eskimos living in four igloos. Chief Akulak invited the party to be his guests and built them a snow room connecting with his own igloo. At the time of writing, Mr. Radford was trying to persuade some of the Eskimos to accompany him on his proposed journey to the Arctic coast, this year, but they hesitated to enlist. All the natives who went with Hanbury along the northern coast, in 1902, have since died and the men at Akulak's igloo have heard that the northern country is a starvation land and that the few people living there would be unfriendly to them. Unless Mr. Radford obtains more native assistance he will not be able to go to the northern coast.

He is enlarging his collection of Arctic mammals and birds, has procured much anthropological data, collected a vocabulary of 500 Eskimo words, the dialect spoken at his winter camp, made small ethnological collections from several communities, kept complete meteorological records and added some details to the maps. He is about 300 miles inland from the Hudson Bay coast and the nearest railroad point is Gimli, Manitoba, 1,600 miles distant.

Studying Big Game. Frederick K. Vreeland of Montclair, N. J., and William F. Patterson of Milburn, N. J., started in July on a trip into the northern parts of Alberta and British Columbia in the interest of the Smithsonian Institution. Their purpose is to determine the northern limit of the habitat of the Big Horn sheep of the Rocky Mountains; to ascertain if in the northern part of British Columbia the Big Horn and the Stoni sheep occupy the same territory; and to capture specimens of both varieties, as also of white goat, mountain caribou, and brown bear. They expect to be gone three months. They will travel by rail to the end of the track on the Grand Trunk Pacific at the Fraser River. From this point they will proceed in canoes by way of the Crooked River to the Parsnip River. When the headwaters of that stream are reached the explorers will make a portage to the headwaters of the Peace River and there re-embark. The two naturalists will explore the mountain wilds on both sides of the Peace River, shooting such specimens as they desire and photographing the country. They expect to get many photographs of wild life in its native haunts. The Canadian law which forbids the exportation of mountain sheep, goats and caribou, will not apply in the present instance, as the Canadian government has conceded the request of the Smithsonian Institution. Mr. Vreeland hunted mountain sheep and goats in the Canadian Rockies several years ago.

AFRICA

The Lobito Railroad. This railroad is to extend from Lobito Bay, a little north of Benguela, Angola, to Elizabethville, and will be the rail outlet to the Atlantic of the Katanga copper and gold fields. The line is now operated to Lepi station (km. 360). The contract for the construction of the succeeding 270 kilometers to Bihé has been awarded by the government to Pauling & Co. It is expected that this section will be in operation by the middle of 1913. Beyond this point the right of way has been pegged to Cuivre (km. 783.5) and a preliminary survey to Matota (km. 868.5) has been completed.

ASIA

Survey of the Mouth of the Menam River. According to the *Daily Consular and Trade Reports,* the Hydrographic Department of the Siamese Navy has begun a survey of the mouth of the Menam River with a view to improvements that will make the river navigable by vessels of large tonnage to Bangkok,

XUM

the capital of Siam and one of the great ports of southern Asia. The capital is situated about thirty-nine miles up the river and occupies both banks of the Menam. The channel has a depth of not less than thirty feet as far as Bangkok, but navigation is impeded at the mouth by a bar which can be crossed by no vessel of over 350 tons. The result is that most vessels in the sea trade are compelled to anchor at the bar and their cargoes are carried to and from the capital on boats. The city has a population of about 500,000. The growing industries and commerce of Siam are in great need of the improved facilities for the trade of its principal port which it is now expected to provide.

TURKESTAN FOGS. In the *Quarterly Journal of the Royal Meteorological Society* (Apr., 1912) are reprinted extracts from a communication by H. A. Dimo, originally published in the *Journal Cpetnoi Agronomii*, concerning the so-called "Turkestan Fogs." These are characteristic phenomena in the southeastern portion of Russia. The population stands in fear of them because of the damage which they are supposed to do to agriculture. They occur twice a year, in spring (April) and in late summer (July-August), and are dust fogs, which the east winds raise in the deserts of Central Asia and which are carried to a great distance when meteorological conditions are favorable. The air is very dry during the prevalence of these fogs, and it is this dryness which is injurious to plants.

The author, however, as a result of his ten years' observations in the Government of Saratov, finds that there seems to be no relation between the condition of the harvest and the duration of these fogs. A series of detailed descriptions of the spring fogs is given, these being the most characteristic, and there is also a set of tables setting forth the meteorological conditions of the fogs. In the spring fogs (*Vessennaia Mgla*) the material transported is of desert origin, while in the *Lietnaia Mgla* (summer fogs) it is mostly of local origin. The author also lays emphasis upon the importance of these fogs in the formation of saline deposits. R. DEC. WARD.

COURSES ON THE GEOGRAPHY OF THE ORIENT. In addition to its courses on Oriental languages the École Spéciale des Langues Orientales Vivantes of Paris regularly offers courses on the geography, history and legislation of the Mohammedan countries and of the Far East. The course dealing with the Far East is in the hands of Prof. Henri Cordier, the well-known Orientalist and member of the Institute. During the past winter term he lectured on the history, geography and customs of China. The course on the Mohammedan countries is given by M. Paul Ravaisse, *chargé de cours*. Under this general title he gave two courses during the term: one on the geography and history of Egypt, the other on the geography of the Near East and the history of Arab civilization.

EUROPE

CHANGE OF PUBLICATION. The series of monographs published at irregular intervals since 1902 under the joint auspices of the Oceanographical Institute and of the Geographical Institute of the University of Berlin under the title of "Veröffentlichungen des Instituts für Meereskunde und des Geographischen Instituts an der Universität Berlin" has been amalgamated with the "Geographische Abhandlungen" founded in 1886 and edited by Prof. Penck. The publication in its new form is entitled "Geographische Abhandlungen: Neue Folge," with the sub-title "Veröffentlichungen des Geographischen Instituts an der Universität Berlin." The first number to appear in the new series is numbered Vol. X, No. 1, thus continuing the numeration of the "Geographischen Abhandlungen."

The series of monographs which thus ceases to be published independently was instituted by von Richthofen on the occasion of the founding in 1902 of the Institut für Meereskunde, whose activities were and are closely allied to those of the Geographical Institute of the University. Of the fifteen notable monographs published in this series mention may be made of the following: "Bericht über die wissenschaftlichen Arbeiten der Deutschen Südpolar Expedition unter Leitung von Erich von Drygalski" (Nos. 1, 2 and 5); "Die nordwest-europäischen Welthäfen in ihrer Verkehrs- und Handelsbedeutung" by Kurt Wiedenfeld (No. 3); "Sitia, die Osthalbinsel Kretas: Eine geographische Studie" by Leonidas Chalikiopoulos (No. 4); "Die Eistrift aus dem Bereich der Baffin-Bai

beherrscht von Strom und Wetter" by Ludwig Mecking (No. 7); "Beiträge zur Kenntnis der morphologischen Wirksamkeit der Meeresströmungen" by Alfred Rühl (No. 8); "Die Faktoren der Wüstenbildung" by Helene Wiszwianski (No. 9); "Die Stellung Armeniens im Gebirgsbau von Vorderasien" by Gustav W. v. Zahn (No. 10); "Die italienischen Portolane des Mittelalters: Ein Beitrag zur Geschichte der Kartographie und Nautik" by Konrad Kretschmer (No. 13), reviewed in *Bull.*, Vol. 41, 1909, pp. 630–631.

THE INTER-POLAR COMMISSION. The Inter-Polar Commission will meet at Rome during the meeting of the Tenth International Geographical Congress, on April 2, 1913.

PHYSICAL GEOGRAPHY

NEW RECORD IN OCEAN DEPTHS. A cablegram from Berlin says that the German survey ship *Planet* sends word from the Pacific that she has made the deepest sounding thus far taken. About forty sea miles off the north coast of Mindanao, Philippine Islands, she has found a depth of 32,078 feet. In other words, the Pacific where the sounding was taken, has a depth of 6.07 miles, exceeding by 482 feet the greatest depth hitherto known.

In 1901, the United States survey ship *Nero*, while studying out a route for our cable line to the Philippines, made a sounding some distance to the southeast of the island of Guam of 31,596 feet, which beat the world's record for sea depths up to that time. This is a depth of 5.98 miles. This location is now known as the Nero Deep. The surpassing sea depth now discovered may appropriately be named the Planet Deep.

This is the second discovery that the *Planet* has made in the neighborhood of the Philippines. A few years ago she traced a deep trough extending for over 200 miles along the east coast of Luzon and only twenty-five to thirty miles from it. She found that the ocean floor descends quite steeply from the island to the trough. This fact and her present discovery probably indicate that the submarine platform on which the archipelago stands, ends rather abruptly on the Pacific front of the islands. The *Challenger* expedition originated the practice of designating all areas with a depth exceeding 18,000 feet as "deeps" and giving a distinctive name to each of them. Some fifty of these deeps are now known.

FROST FORECASTING AND PROTECTION.—The United States Weather Bureau officials on the Pacific coast are giving more and more attention to frost forecasting and to frost protection, and in connection with the effort to improve these forecasts the local conditions of frost occurrence are being studied in great detail. Fruit raising has increased enormously in the North Pacific States of late years, and it is estimated that the number of trees which will come into bearing in the next five or six years will increase the acreage at least tenfold. These fruit interests want to know "just how cold it will get, and just when it will be necessary to start the fires." Mr. E. A. Beals, District Forecaster at Portland, Ore., has been making investigations in four important fruit districts, the results of which have now been published. Boise and Lewiston, Idaho, and the Rogue River Valley and the Yakima Valley were selected as districts in which such detailed observations should be made. "Key" stations were established in these districts, and competent observers were detailed to carry out the work. The "patchiness" of frost occurrence, and the considerable differences of temperature at places which are very near together are clearly indicated in the results of the observations. There are also interesting details regarding the local adiabatic warming of rapidly descending currents of air at the outlets from higher valleys, giving higher temperatures and frequent immunity from frost near these outlets. Many of these details are worked out, and illustrated by means of sketch topographic maps. Several interesting conclusions are reached.

For example, regarding the somewhat disputed connection between the dew-point and frost we find (p. 38) that dew-point observations taken from two to four hours later than the time of the regular evening observation agree more closely with the following minimum temperature than do those taken at the regular hour, and that the average difference and the range of the differences between the dew-point and the following minimum temperature are greatest with clear or partly cloudy weather and least with cloudy weather. Frosts are classi-

XUM

fied as follows: First, the common hoar frost, which occurs when the temperature sinks to the dew-point and the dew-point is below freezing. Second, a dry freeze, when the temperature sinks below the freezing-point and the dew-point is still lower than that mark. Third, general "freezes," when the air is thoroughly mixed and the whole mass is below freezing. The first two are usually the most damaging. It is probable that the most damage is done by a dry freeze, as the thawing of a plant which is encased in ice is slower than the thawing of one which is frozen without such a covering. In the case of a general freeze the weather is usually cloudy or partly cloudy, and the winds are always somewhat brisk, if not actually strong. The thawing in such cases is slow. These are the freezes concerning which the statement is often made, "The damage was not as great as expected." ("Forecasting Frost in the North Pacific States," by F. A. Beals, *U. S. Dept. of Agric., Weather Bureau, Bull.* 41, 1912.)

R. DeC. WARD.

MEASUREMENTS OF DEW. The measurement of dew has always been a difficult problem, and no form of "drosometer" has proved to be entirely satisfactory. Yet dew, in some climates, is of considerable importance for vegetation, and its measurement is distinctly worth while as a part of the regular meteorological record. At a recent meeting of the Royal Meteorological Society, London, Mr. Sidney Skinner read a paper on "The Drosometer, or Measurer of Dew" (*Quart. Journ. Roy. Met. Soc.,* April, 1912), in which he described a new form of such an instrument. This consists of a hemispherical glass vacuum-jacketed vessel, of the type designed by Sir James Dewar for holding liquid air, which is placed in a box having a circular aperture in the top, through which the cup is exposed, with its rim flush with the exterior surface of the box. When this is exposed to the sky the glass radiates and cools until dew is deposited on the interior of the hemispherical cup. As the vacuum at the back of the cup is an exceedingly good non-conductor, it follows that the heat which is lost by radiation from the inner surface of the cup must be drawn from the air in the cup, and as soon as this is reduced to the dew-point, moisture begins to form on the glass. In the morning, after exposure during a clear night, the small drops separated on the glass have run together, and a circular pool is found at the bottom. The cup is generally exposed at sunset, and taken in in the morning before the rays of the rising sun have reached the place where it stands. A rain-gauge is placed by the side of the drosometer, and consequently the presence of rain in any appreciable quantity can be recognized at once. R. DeC. WARD.

PERSONAL

CAPTAIN AMUNDSEN. The Livingstone gold medal of the Royal Scottish Geographical Society has been awarded to Captain Roald Amundsen for his geographical discoveries on his recent expedition to the south pole.

W. M. DAVIS AND R. A. DALY. Dr. W. M. Davis has retired from the Sturgis Hooper professorship of geology at Harvard University. He will continue to reside at Cambridge. Professor R. A. Daly, of the Massachusetts Institute of Technology, has been appointed to the chair vacant by the retirement of Professor Davis.

O. D. VON ENGELN. Dr. O. D. von Engeln has been promoted to an assistant professorship of geography at Cornell University.

U. S. GRANT. Prof. U. S. Grant of Northwestern University, intends to spend most of the summer in Evanston, completing a report on part of the Kenai Peninsula, Alaska, and also completing, in cooperation with Mr. G. H. Cady of the Illinois Geological Survey, the La Salle-Hennepin folio for the U. S. Geological Survey, which is being prepared in cooperation with the Illinois Geological Survey. The Geographic Society of Chicago is contemplating an excursion to the Glacier National Park this summer, under the leadership of Professor Jesse L. Smith, chairman of the excursion committee of that society. If the plan is carried out Prof. Grant expects to go along as scientific adviser of the party.

F. H. NEWELL. Frederick Haynes Newell, director of the United States Reclamation Service, delivered the commencement address at the Case School of Applied Science on May 29, his subject being "The Engineer in Public Service." At the close of the address the honorary degree of doctor of engineering was conferred upon him.

GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

BOOK REVIEWS AND NOTICES

(The size of books is given in inches to the nearest half inch.)

NORTH AMERICA

Die Erzlagerstätten der Vereinigten Staaten von Nordamerika mit Einschluss von Alaska, Cuba, Portorico und den Philippinen nach Geschichte, Form, Inhalt und Entstehung. Von Charles L. Henning. xviii and 293 pp. Maps, ills., index. Ferdinand Enke, Stuttgart, 1911. 10 x 6½.

The author has compiled for German readers a partial synopsis of the work done in mining geology in the United States. As might be expected, the important results obtained by the geologists of the U. S. Geological Survey figure conspicuously throughout the text. In more than one respect the book might be defined as a review of the work done by this federal bureau in the past twenty years.

Some notes on the founding and organization of this celebrated institution have been inserted in the first few pages. We have looked in vain, however, for an appreciation of the strong impetus given to this scientific work through the growing recognition of its value by the more important mining companies.

The short but comprehensive sketch of the mining laws of the United States and the method of locating claims in the various States will enable readers to understand American procedure in this respect. A synopsis of the views of some American geologists on that phase of metamorphism which deals more particularly with the genesis of ores is given. This refers mainly to the various theories brought forward in the United States in the past decade. To Germans who are unacquainted with the enormous progress made on this side of the Atlantic, this résumé will be instructive, although, here, it is felt that more space might not unappropriately have been devoted to the recent consideration of many of the deposits as extreme products of magmatic differentiation. The Great Basin region in particular, and the numerous mines scattered elsewhere, wherein the occurrence of ores is directly connected with former manifestations of volcanic activity supply data which are bound to be of the utmost value to foreign students.

Lindgren's classification of metallogenetic epochs precedes the review of the various ores which appear to have been classed in the order of their relative commercial importance. Their occurrence in the United States and possessions will also reveal to German readers the mass of details accumulated by American mining geologists who have had the advantage of examining the heavily exploited districts of their country. Therein lies the chief interest of this work.

The text offers much of geographic value regarding the occurrence of minerals of economic importance in the two broad zones, roughly east and west of the Rockies, in which the author divides the United States for purposes of economic mineralogy. This also holds true with regard to the regional distribution of these ores. It should be stated here that a comprehensive map showing such distribution would have interpreted far more adequately many a phase of the subject. Its value would have at least been equal to that of the excellent glossary of technical terms appended to the text. All told, the author certainly deserves the gratitude of German students for enabling them to draw on the valuable data accumulated in this country and which might possibly have been beyond their reach otherwise. LEON DOMINIAN.

The Silva of California. By Willis Linn Jepson. 283 pp. Vol. 2 plates, maps, and indexes. *Mem.* of the Univ. of California. Berkeley, 1910. $10. 13 x 10 each.

This highly important and well-executed work will be a standard reference

XUM

volume for dendrologists everywhere. It will be dealt with more properly in the journals of botany. I trust that I shall be forgiven the personal note in a comment which the inspection of these two stately volumes leads me to make. Prof. Jepson has completed a task which was the life work of one of the sweetest souls who ever gave up a lifetime to the massive botany of the trees, nowhere more massive than in the Californian mountains, Dr. Albert Kellogg. A quarter of a century ago it was my privilege to share the working table at which Kellogg day after day was elaborating his drawings from field sketches and herbarium specimens. Those were days of high zeal in the California Academy of Sciences, days of disregarded poverty, for not yet had Lick's endowment become available. Kellogg completed his drawings of the oaks and the conifers, he did not live to complete the work which now at last is accomplished. After Kellogg's death Prof. George Davidson endeavored to secure the publication of this great collection of drawings. The purse of the Academy, all at once become fat, was closed against this memorial to the simple soul who had kept alive the flame of study in the long years of poverty, himself a founder of the institution. An obstacle was always grateful to Davidson when he knew himself in the right; he secured a Mæcenas and thus provided for the publication of the oaks, a bantling without academic fathering, under the title of "West American Oaks" for which the text was written by Prof. E. L. Greene. It is most gratifying to observe that Prof. Jepson gives cordial credit to his predecessor. Without slighting in the least the necessities of formal botanical description the author has set before himself the purpose of making his work of value to the layman; this is well accomplished in general. Particular interest will attach to his careful study of the redwood and the sequoia, the big trees of the Sierra and the Coast Range. WILLIAM CHURCHILL.

Canada. By A. G. Bradley. Home University Library. 256 pp. Index. Henry Holt & Co., New York, 1912. 50 cents. 7 x 4½.

The history of Canada is related in a very interesting and vivid style. For one who is seeking only a general knowledge of the critical periods in the development of the Dominion, this book will answer. The presentation is from the viewpoint of an Englishman and therefore is of special value to the American reader. It is worthy of note that the entire discussion is free from bias.

Chapter I presents the geography of the region in an excellent non-technical descriptive manner. It is rather unfortunate, however, that a map does not accompany the text. Chapter II, "The Conquest of Canada," brings out a number of illustrations of the close relation of historical events to the physical environment. A quotation from the last paragraph of Chapter VIII, "Prairie Provinces," referring to southwestern Canada, will indicate the general tone of the geographic discussions in the book:

"Gold, silver, coal, iron, fruits, wool, tropical products, timber, can all create wealth and population. But these by themselves are not comparable, for the up-building of a hardy race, to a deep rich soil in a bracing climate, where both the essentials of a local subsistence and food products that the outer world must have are grown at the door over thousands of square miles."

While this book is not wholly scientific and no doubt is intended as a history rather than a geography, it is worthy of recognition by the geographer. A descriptive bibliography of 16 titles is appended. EUGENE VAN CLEEF.

SOUTH AMERICA

Reisen in Bolivien und Peru. Ausgeführt 1908. Von Rudolf Hauthal. Maps, illustrations, appendices and index. x and 247 pp. Wissenschaftl. Veröffentl. der Gesell. für Erdkunde zu Leipzig. 7. Band. Verlag von Duncker & Humblot, Leipzig, 1911.

Prof. Hauthal's book is mainly concerned with the former glaciation of South America's tropical plateaus. His earlier work showed Patagonia under a glacial ice sheet from the Atlantic to the Pacific south of the 49th parallel. Here we have him looking for evidence of glaciation in the arid highlands. He found it and the book establishes the fact solidly with all desired detail of glaciated ledges, moraines and morainic lakes. Oversteepened valleys and hanging tributary valleys are not in his vocabulary, but he saw them, especially

in the country above Lima. He quotes with approval Steinmann's view that glaciation was contemporary in both hemispheres and the cause, extra-terrestrial. In South America there were plainly two glaciations, the first heavy, its glaciers descending in Peru to 2,800 meters, in East Bolivia (E. side of Cordillera Real?) to 3,000 and in the northern Argentine to 3,500. In the second, the lowest points reached were a thousand meters higher. At present the ice tongues are 800 or 900 meters higher still. One judges that little of Bolivia was ever under ice. This must be charged to the aridity of the region.

The discussion of wind and precipitation that occurs at several points seems to be the weak part of the book, the only weak one in a very strong work. This comes up in connection with the very interesting question of the relative height of the snow line, etc., on the eastern and western ranges. Meyer and Reiss are quoted as finding the snow line lower toward the Amazon in Ecuador. Hauthal, though seeing but the west side of the Cordillera Real in Bolivia, is satisfied from all reports that the opposite is true there, *i. e.*, that the glaciers lie lower on the western slope. He explains it for his season, December to March, by daily clouding toward noon, thus keeping the western sun from shining on the mountains and melting the snow. But he suggests that this might be different in June-July, when a cloudless sky allows equal insolation on each slope. It is argued at page 117 that this would give the snow line equal height on each side, but at 171 the stronger afternoon sun is supposed to melt more on the west and give a higher snow line there. He makes the important point that snow line measures in this region should be made at the same season or they are not comparable. Yet he was astonished above Lima to see the low Sierra de la Sal, 160 kilometers to the east, with more ice on it than on the higher, western ranges. He thinks the east winds from the Amazon basin should be warm and melt the eastern snows or keep the ranges too warm for snow to fall on them.

It seems here that he must fail to take into account the adiabatic cooling that accompanies the uplift of these eastern airs through heights of 10,000 to 20,000 feet. The hot airs of the La Paz valley (p. 172) should be cooled to freezing by the expansional loss of temperature before they reach the plateau even if they were at 90° in the plains and lost some rain with liberation of latent heat on the way. Greater snows are to be expected near the Amazon basin because of the greater moisture in the air there. Prof. Bowman tells me he found the same thing there. It is for this that season matters so much. The present writer recalls his astonishment in three winters that he spent just east of Aconquija in northern Argentine to see the mountain bare in the cold weather but often snow-clad in the rains of summer (December). Nor is the snow fall in Patagonia with east winds strange to anyone familiar with the cyclonic winds.

Apart from this minor detail no one could read Hauthal's pages and doubt the glaciation. It is thoroughly made out.

Even more interesting are his notes of travel, notably in Bolivia on the highland, of which he gives a vivid picture. He has no suspicion of a peneplain. For him it is an upland made from great folds of rocks striking N. W.–S. E. on which numerous volcanoes have poured out their lavas and filled the hollows. A lively example of travel is the extra-post trip from Oruro to La Paz, 200 kilometers in 24 hours over a roadless land. One gets a vivid picture of the handful of Bolivians of European blood ruling the hostile Aymaras who vastly outnumber them, through the Cholo half-breeds of double affinities. His travel notes make singularly good reading and so too his brief touches on the antiquities of the land. At Tiahuanaco the ruins deteriorate perceptibly between visits. The young men of La Paz make revolver practice on the ancient carvings. He has hearty words of praise for citizens of the better classes both of Bolivia and Peru. They are striving for better things.

MARK JEFFERSON.

ASIA

Le Laos. Par Lucien de Reinach. Édition posthume, revue et mise à jour par P. Chemin Dupontès. vii and 392 pp. Map.* E. Guilmoto, Éditeur, Paris. 1911. Fr. 7.50. 9 x 5½.

The author of this work died before his task was done. In the form in which it sees the light it is the erection of a monument to the memory of a

* Listed under "French Indo-China" in *Bull.*, Vol. 43, 1911, p. 877.

competent administrator in the French possessions in the Orient, the gratification of the piety of warm personal regard on the part of the editor, Father Chemin Dupontès. But because of a somewhat mechanical method the monument stands rather as a cenotaph, a far less satisfactory sort of memorial. It is clear that the reverend editor has assembled all the unfinished fragments left by Captain de Reinach and has sought to fill the gaps where the manuscript had not developed the theme in full. This he has done for the most part by the insertion of somewhat extensive extracts from the work of others, his dependence being largely upon the work of Colonel Tournier, the reports of recent governors and other volumes most readily accessible to the student of the affairs of Indo-China. The result of this method is to present the appearance of patchwork. The title, that is to say the proper nomenclature of the people, involves a controversy. The French, following the usage of the neighbor people, give it as Laos. In Mrs. Milne's work on the Shan the Rev. Mr. Cochrane is positive in its determination as Lao; it appears that to this determination he is led by the assumption that s-terminal in Laos is the s-plural, a mechanism of grammar which is inapplicable to an uninflected language. We recall upon the spot a wide variety of sound varying from a clear sibilant through various obscurities to its complete obliteration. In these southern tonal languages the pure sibilant tends toward frequent mutation to the aspirate, and such an aspiration when terminal after a vowel is not always recognizable by the European ear. Despite the positive statement of Mr. Cochrane, rendered at some little distance from the seat of the Laos, we incline to regard the French as the better authority and shall continue to employ the designation Laos. No matter what the general designation may be decided to be, the study of the Laos must engage with three distinct categories of population, the Thaï, the Kha, and alien migrants from the limiting communities of China, Yunnan, Annam, Cambodia, Siam and Burma; these three elements form various areas of contamination surrounding foci of Thaï and Kha culture. Upon these elements Captain Reinach spent considerable and enlightening study which is manifest in his chapters on social life and manners and customs. He is equally full and satisfactory when dealing with matters of administration.

Owing to the conditions of his employment in the colonial service the author is able to add little that is new in his study of the geography of the region. His duty held him in the second rank of progress, his was the task of following in the steps of exploration and of conquest, of consolidating the wild and establishing the new civilization. But he has been able to present many definite determinations, valuable points to have settled in economic geography, the head of steam navigation in the rivers, the head of canoe navigation still farther within the interior, the terminus and the feasibility of the narrow trails which are the best the jungle affords by way of roads. Despite the defects of the manner of the completion of the work, it must stand as by far the best account of a state which will possess in the future still greater value to France as the years uncover its designs upon Siam, whose inner entrances Laos covers.

WILLIAM CHURCHILL.

Seistan. A Memoir on the History, Topography, Ruins, and People of the Country. In four parts. By G. P. Tate. Parts I to III. 271 pp., Maps, ills. Superintendent Government Printing, India. Calcutta, 1910. £1. 12s. 12 x 10.

This is a memoir on the history, topography, rivers and people of the region. The information was chiefly gathered during the sojourn of a boundary commission. The volume includes the treatment of the first three of the above named topics. It is written without perspective. The history so-called is so dreary a succession of trivial records, that it can be useful only as a source for scholars. Even these, it would seem, might derive advantage from a clear and summary picture of the larger meaning and progress of human events in that obscure part of the world.

The same criticism is painfully true of the chapters on the "Topography of Seistan." They commit the unpardonable sin of being, except for one district, without maps. There is nothing to show the relation of localities to each other, or of the whole to its environing territory. The keenest reader, who has not studied the geography elsewhere, is helpless in trying to picture the country. We are told, for example, that the "Khash River emerges from the hills at a place

called Dilaram." No doubt the Khash River is an interesting stream, and we might like to be told what kind of a valley it has, what its volume is, and its direction of flow, where the hills are, and their character. So far as we are concerned, it might as well be in the Sahara. So we are led from one inconsequential detail to another, and at the end of a paragraph, at the end of weary pages, we wonder if anything in that part of the world has a place or a meaning.

It is interesting to read that Seistan has suffered progressive dessication, but we wonder how this is arrived at by a "mental survey of the country." True it is affirmed that there are old beaches and deltas, but again there is no coherent account of the evidence, and not a single photograph, though the party made good pictures of some kinds of things. Two maps, following page 177, do illustrate the delta of the Helmand, but as a whole the account emphasizes that rarity of good geographic description on which Professor Davis has laid much emphasis. It is without method and conveys no adequate idea of the region, of its features, or of the principles illustrated in its physical history. A large number of full-page plates give effective reproductions of ancient human structures.

We have rarely seen a volume in which one could read so much and get so little. There are many facts, as there are many grains in an acre of Seistan sand. As to relative dryness no conclusion is here urged. The plan proposed in the preface to record information rather than aim at literary effect, is fully realized. A. P. BRIGHAM.

AUSTRALASIA AND OCEANIA

Reisen in Kaiser-Wilhelmsland (Neuguinea). Von Dr. Otto Schlaginhaufen. 19 pp. Map, ills. Abhandl. und Berichte des Kgl. Zool. und Anthrop.-Ethnogr. Museums zu Dresden, Vol. XIII, 1910, No. 1. B. G. Teubner, Leipzig, 1910. Mk. 6.50. 12½ x 10½.

When the German New Guinea Company made its start as a political balance weight to the British North Borneo Chartered Company there was immediate prospect of the exploration, even if not the commercial exploitation, of the northern slopes of the great and little-known island. But when that company surrendered its plans to an imperial protectorate the interest slackened and for several years no activity of discovery was manifest. Now that the colony has been associated with the earlier and better founded settlement of the Bismarck Archipelago there has been a considerable revival of interest. In this pamphlet Dr. Schlaginhaufen presents the cursory record of two inland trips which in 1909 he accomplished into the unknown inner land of New Guinea. One was the exploration, to a distance of more than a degree of latitude, of the lower course of the Kaiserin Augusta river, which debouches a few miles north of 4° S. The other was a mountain climb across the mass of the Torricelli Mountains and a visit to the inland communities of Apur and Akur. Every such report, brief though it be, is of inestimable value in adding to our knowledge of this least-known of the great islands of the world. WILLIAM CHURCHILL.

EUROPE

Dünenbuch. Werden und Wandern der Dünen, Pflanzen- und Tierleben auf den Dünen, Dünenbau. Bearbeitet von F. Solger, P. Graebner, J. Thienemann, P. Speiser und F. W. O. Schulze. viii and 404 pp. Ills. Ferdinand Enke, Stuttgart, 1910. Mk. 10. 9 x 6.

A description and study of sand dunes on the German coasts. The geological part was written by Professor Solger, the botanical by Professor Graebner, the zoological by Dr. Thienemann, the entomological by Dr. Speiser, and the technical by Professor Schulze.

Professor Solger distinguishes three types of dunes which correspond each to a certain type of shallow coast. On bluff coasts no dunes are formed because the land, being continuously eaten away by the waves, leaves no place for the sands to collect. The shallow coast in process of advancement is the typical dune coast. It has a sand beach with a wooded or shrubby hinterland back of it. The sand blowing inland from the beach gathers along the out-

XUM

skirts of vegetation forming the first line of dunes ("Ur-Düne") on which *Psamma Arenaria* soon appears as the first pioneer of vegetation. In proportion as the coast advances, and the width of the beach thus increases, a second line of dunes is formed along that new border line of vegetation, and is occupied by *Psamma* in its turn, while the one farther back is now invaded by species from farther inland. This process repeats itself over and over again until a complete system of parallel ridges accompanies the coast, always with the floral transition from *Psamma* at the front to a more and more differentiated vegetation farther back, each stage of which corresponds to an anterior stage in the formation of the coast.

Another type is found in those locations where, owing to strong coastal currents which carry the sands away, the shore line is practically stationary. Therefore the sands which are blown up from the beach accumulate pretty nearly at always the same places, so that one line of dunes only can be formed but of a height considerably superior to that of the previous type. This type is best developed on the *Nehrungen* (spits) of the Baltic coast. The dunes there used to be so stationary that considerable forests grew on them. But during the Seven Years' War they were deforested by the Russian troops, and since then the dunes have wandered all across the spits, burying everything under them. The author devotes a special chapter to the heroic efforts made in these provinces to stop further progress of the dunes, and prevent the complete filling in of the lagoons (*Haffe*) by reforesting the dunes.

A third type is found on shallow coasts in process of recession. It occurs wherever a beach which was formed under the protection of a neighboring headland loses that protection by the destruction of the latter. Then the sea begins to eat away the beach and sooner or later also attacks the dunes, forming a dune bluff. In proportion as the coast recedes, the sands taken from the original dunes are blown farther inland, the wind pushing the dunes, as it were, before it until they finally rest on the soil of the land itself, and when this land is attacked by the waves in its turn it offers the misleading aspect of a bluff coast with dunes on top of the bluff.

The author illustrates these processes very fully by exact reference to different parts of the German coast near popular seaside-resorts, thus enabling even persons not especially acquainted with the geology of Northern Germany to study these processes *in situ*. The American observer who has studied similar problems on the shores of Cape Cod and its neighborhood will find there many points of comparison along different lines.

In an additional chapter the author proceeds to a short study of desert dunes, with especial reference to the inland dunes of Northern Germany, developing his special theory of the latter having been formed under the influence of prevailing east winds.

Professor Graebner, in his description of plant life on the dunes, first explains the general conditions needed for dune vegetation and then discusses the various types of plants found on the different types of dunes. On the beach itself and the "white" sand dune succulent and sand-catching species predominate (*Salicornia, Hockenya*). At a later stage *Hordum, Petasites,* etc., fasten the sand with the network of their roots, allowing the first annuals to grow. After them various *algae, Cakile maritima, Salsole* and others already give a "grey" aspect to the dune forming the first vestiges of soil which allow the growth of biennials (*Oenothera*), and of certain creeping shrubs as *Salix repens, Rosa pimpinellifolia,* etc. Later still, the "shrub dune" bears *Hippophaïs, Salix daphnoïdes, Quercus pedunculata,* and in its moist hollows a pronounced marsh and salt flora can develop. The "wooded dune" represents the conclusion of the process, and the variety of its trees is greater than might be supposed. The inland dunes, too, are treated in a botanical chapter by themselves.

The zoological parts contain principally enumerations and descriptions of the various animals, birds, reptiles, and insects which inhabit the dune region, together with hints about how to find them; and the last chapter describes the technique of the different ways and methods of regulating the progress and formation of dunes in the past and present.

The book is richly and well illustrated, and though intended principally for the intelligent lay reader, contains much that is of value also to the specialist.

MARTHA KRUG GENTHE.

ECONOMIC GEOGRAPHY

Die Kabel des Weltverkehrs, hauptsächlich in volkswirtschaftlicher Hinsicht. Dargestellt von Dr. Max Roscher. x and 240 pp. Map. Putkammer & Mühlbrecht, Berlin, 1911. Mk. 6.60. 9½ x 6½.

A useful volume; if it had an index it would be a veritable dictionary of cable-knowledge. The first cable, in 1851, was of course Dover to Calais. Transatlantic cables cost $1,000 a mile, telephone cables twice as much and are limited to 250 miles; land lines half as much and wireless less than half as much. The great cables earn $96 to $128, cost for repair $38, and to operate $27 a mile. Deep sea cables last 40 years, shallow ones 25. The English line, Cape Verde to Pernambuco, worked for nine years once without interruption. The longest clear stretch is Vancouver-Fanning Island, 4,000 miles. Each mile of this cable contains 600 pounds of copper and 400 of guttapercha, costing $8 for guttapercha to every dollar expended for copper. Guttapercha is the only good insulator hard enough to stand the deep sea pressure.

England is the great cable power. She had in 1908 over 158,000 miles of cables, the United States 58,000, France 27,000 and Germany 18,000. But Germany laid 80 per cent. of her cables in the last decade, we 45 per cent. of ours, France 39 and England only 17 per cent. of their respective lines, though England's 17 per cent. was 28,000 miles, more than any other country laid. The Germans now have cables to North America, to Liberia and thence to Brazil and a line in the East Indies from Celebes to Yap in the Caroline group, where it connects with our Pacific cable and goes on to China and Japan. Other American lines give the Germans connection with the west coast of South America, but to their own colonies in South Africa, to Australia and India they have only British connections. The drawback appears to be really what happened during the Boer war. In war time only open messages can be sent, through a British censor. Monopoly makes the price high on the West Coast of Africa, but it is commercial not national monopoly. Cape Town is equally British, but, being reached by several lines, a word from Germany costs there but 65 cents against $1.40 to the West Coast. From Germany to Chile it is but $1.07. The new British Pacific cable, too, lowered the rate to New Zealand from $2.75 to 78 cents—surely a low rate.

A strong argument is made for the influence of cables on commerce. British commerce in the region reached only by British cables is four times as great as German business, though in general the relation of British commerce to German is only 5 to 4. The lands involved are largely British. Roscher sees British opposition to the expansion of German cables everywhere. The most serious form of this is the difficulty of getting "landing right" for a new cable. The early companies (all British) got concessions from countries eager to have cables that gave them exclusive right to land a cable in their territory. Such a concession, or such a claim, is keeping the Germans from landing a cable in the Argentine Republic, whither they would like to extend their line from Pernambuco.

If Roscher's map is correct, the British are similarly excluded from most of the North Sea and all of the Baltic, where only the Danish Great Northern operates.

The author sees no commercial competition in wireless, at present, owing to its uncertainty. He discusses the most various relations of cables to culture, commerce and war, and the history of cable laying is set forth very interestingly. The book is clearly written and has an admirable map of cables in 1908.

MARK JEFFERSON.

Railroad Traffic and Rates. By Emory R. Johnson and Grover G. Huebner. Vol. I, Freight Service, xv and 523 pp. Map. Vol. II, Passenger, Express, and Mail Services. ix and 448 pp. Map, ills., index. D. Appleton & Co., New York, 1911. $5. 9 x 6.

The preface states that the work has grown up in connection with advanced instruction in transportation given in the University of Pennsylvania. It is designed, however, mainly for students of railway problems who are actively engaged in the service. Many practical experts have read and criticized the

various chapters. The work, therefore, takes on an authoritative character, both from the authors and their critics.

With the exception of two of the three introductory chapters, Volume 1 is occupied with matters pertaining to freight traffic. These two chapters deal with the characteristics, volume and earnings of American railway traffic in general. Some interesting factors of a geographic nature at once appear. A ton of freight is hauled on the average in the United States, 254 miles, or more than three times as long a haul as in Great Britain, France, or Germany. The ton mileage is six times as great as in Great Britain, nine times as great as in Germany, and twenty times that of France.

Again, it is the vast size of our territory which has prescribed large units of traffic, as the profitable method here, in contrast with the small units of comparatively local traffic in European countries. Topography has its influence here, but, curiously, one large result is in equipment and construction, for the majority of the trunk lines follow the parallels of latitude, even though they must thus cross the mountain systems of the East and West. The efficiency of our transportation appears in the fact that industry shows a high degree of territorial specialization, in spite of the necessity of carrying heavy raw materials over longer distances than prevail in most countries. The chapter on the sources of American railway traffic is a compact summary of the distribution of our chief resources and products.

It is a rather surprising fact that manufactured commodities and even lumber and forest products slightly exceed in tonnage the products of agriculture. The mineral tonnage is more than half the total, coal being the largest single item. More than half of the total tonnage originates east of Illinois and Lake Michigan, and north of the Ohio and Potomac Rivers.

Another interesting geographic change is seen in the decline of cotton shipments from the south Atlantic ports. This is due to two causes, viz., the westward movement of cotton production, and the increase of local manufacture in the Southern Appalachians. A valuable table on page 44 compares the types of freight on several great railway systems. The Chesapeake and Ohio and the Pennsylvania railroads have the highest percentages of mineral traffic, 73 and 66 respectively. On the other hand, about one-fifth or sixth of the percentage of agricultural products is shown by these roads, as compared with the Rock Island, Santa Fé, Central of Georgia, or St. Paul.

The organization, management, classification and rates of the freight service occupy the remaining twenty-two chapters of the first volume. The expositions are practical, and technical, and are accompanied by many statistical tables, blank forms in use on various roads, and full lists of references.

Volume 2 deals with the passenger service (eight chapters), passenger classification and fares (three chapters), the express service (ten chapters), and provisions of the rate act of 1910 (one chapter). Appendix I reproduces this act, a document of more than thirty pages, and Appendix II gives the decision in the Reno Rate Case.

The index is at the close of the second volume. The attitude of the authors is expositional and neutral, for the work neither attacks nor defends the railroads.

A. P. BRIGHAM.

Railways in the United States. Their History, Their Relation to the State, and an Analysis of the Legislation in Regard to Their Control. By Simon Sterne (1839–1901). With supplementary Notes continuing the Record to 1911. xiii and 209 pp. Index. G. P. Putnam's Sons, New York, 1912. 8 x 5¼.

Mr. Simon Sterne was long a member of the New York bar and during the later decades of the nineteenth century was a high authority on the legal and governmental aspects of railway management. This volume is a republication of papers and addresses prepared by him at various times. They represent, in substance, material prepared by Mr. Sterne for the use of railway commissions. While showing the conditions of an earlier period, the work is still available for the education of legislators and voters, in the important railway problems of the present day.

The first chapter deals with the history of railways and with their economic

and social aspects and results. Railway development from its beginnings, the effect of railways in diminishing cost of commodities, the more even distribution of products, and the increase of production by reason of railways, are among the topics treated and they offer some principles and examples which are pertinent to geography. There is also a comprehensive summary of railway management in the leading countries of Europe. Nearly half the volume is occupied with an account of legislation concerning railways by the various states and by the federal government. "The Relation of the Railroads to the State" is an address first given before the Wharton School of Finance and Commerce of the University of Pennsylvania.

The preface includes a list of the author's more important legal arguments and reports. The editor has included supplementary notes, bringing the view down to the year 1911. A. P. BRIGHAM.

Highway Engineering as presented at the Second International Road Congress, Brussels, 1910. By Arthur H. Blanchard and Henry B. Browne. x and 299 pp. Appendices, indexes. John Wiley & Sons, New York, 1911. $2. 9 x 6.

The authors are teachers of highway engineering in Columbia University. An international congress on roads was held in Brussels in 1910. The object of this volume is to make available in compact form the voluminous report of that meeting. The authors express the opinion that foreign practice has not received from American engineers the attention which it deserves. As 124 papers were presented, it is evident that the substance and conclusions only could be included in this work.

The first congress of this nature was held in Paris in 1908. At that meeting a permanent commission was appointed to promote in various ways progressive road-making for all countries. Titles of all the papers presented are given by the name and countries of the authors, and in groups according to subject. The introductory chapters include also an account of an exhibit of machinery and materials held at the time in Brussels and of the excursions and receptions given.

Most of the volume is occupied with abstracts of the technical discussions. The range of these is very broad, concerning not only materials, constructions and maintenance, but such subjects as removal of snow and ice, road signs, pipe systems in roads, tramways on roads and streets, highway bridges, and tires. Full subject and author indexes are furnished. The book is for reference and is of interest to engineers and special students rather than to the general reader. A. P. BRIGHAM.

Principles of Rural Economics. By Thomas Nixon Carver. xviii and 386 pp. Index. Ginn & Co., New York, 1911. 8 x 5½.

The author is a professor of political economy in Harvard University, but has had the advantage of early life spent on a farm in the middle west and of much personal observation of farming in this country and in Europe. He is therefore justified in attempting to contribute toward the solution of the rural problems so long overlooked, but now recognized and studied. The first chapter, on general principles, discusses ways of getting a living. The modern farmer, who lives on the profits rather than the products of his farm is shown to be in close economic relations with his fellows. Agriculture is, however, peculiar in its seasonal character, in its domestic aspect, and in the features of self-employment and the interdependence of the sexes. Urban superiority is a false conception, while isolation is the menace of farm life, as congestion is the menace of city life.

Nearly one-fourth of the volume, is devoted, in chapter II, to a historical sketch of modern agriculture,—the early stages, beginnings of modern agriculture, beginnings of American agriculture, and the period of national development. Pages 89-105 give an informing exposition of geographic changes incident to the invention of machinery, and to the development of new processes in farming, and the working up of farm products.

Good statement and defence are given of the view that a large product per acre is not in itself desirable. The real object is the large product per man.

XUM

Hence intensive culture and small farms, are not as some think, the solution of all our problems. The striking fact is set forth that the substitution of cotton for woolen has made a great saving of land, one acre of cotton producing as much clothing as ten acres given to sheep raising.

Other chapters treat management, distribution of agricultural income, and problems of rural social life. The book has a detailed outline of contents, a bibliography of eight pages, and an index. It is closely but clearly written, from the point of view of the economist, and it deserves, as it requires, careful study. While it is keenly interesting, it is not a book of popular information, but a compact manual for the serious student of agriculture.

A. P. BRIGHAM.

The Principles of Handling Woodlands. By Henry Solon Graves. xxi and 325 pp. Ills., index. John Wiley & Sons, New York, 1911. $1.50. 8½ x 5½.

The author shows his grasp of the existing problems of woodlands by basing his work on the actual status of knowledge in the hope that the next step will be towards ideal conditions. The work deals with the treatment of woodlands, omitting methods of artificial seeding and planting, and discusses systems of cutting, the improvement of the forest and problems of protection. Four systems of cutting are explained: the selection, clear-cutting, shelterwood and coppice systems. Under the improvement of the forest, the author presents the improvement of the composition of the stand, of the form of the trees and increase in the rate of growth and in the yield and value of the product. A large section is allotted to the protection of forests from fire. The book is well printed and well arranged to serve as a convenient hand-book.

ROBERT M. BROWN.

EDUCATIONAL GEOGRAPHY

Anleitung zum Kartenzeichnen. Von Konrad Kretschmer. viii and 72 pp. Map, ills. Hugo Spamer, Berlin, 1911. Mk. 3. 8½ x 5½.

Professor Kretschmer has tried to write an easy manual for beginners at map construction and has succeeded admirably, for the little book is simple, clear, practical and up-to-date. One needs but the elements of trigonometry to use it. It gives much more space to practical exercises than to the general theory, which is yet always there and it makes possible the construction of even equivalent azimuthal map-nets. Kretschmer breaks away from the traditional perspective projections, there is not a word here of the orthographic and stereographic projections that figure in all our text-books, but are little used in our atlases. Beginning with Earth dimensions in meters, he goes at once to their use for map-construction by means of the scale, beginning with conic nets, then passing to azimuthal ones and the Mercator. The example is always an actual problem of an appropriate region on a specified scale and the student is shown how to work out every detail. Tangent cones, simplified cones and Bonné's projection are all explained and the construction by coordinates of curves of excessive radius. The special applications of each projection are made plain. This is distinctly the best introduction to map-making that the present reviewer is acquainted with.

MARK JEFFERSON.

Teachers' Geography. Man and Climate. With Practical Exercises. 3rd Edition. By Mark Jefferson. 78 pp. Maps. Published by Author at Ypsilanti, Mich, 1911. 11 x 8.

This book embodies some of the results of a teacher's long experience with students in Normal Schools and Colleges. It cannot be denied that the majority of these students came to their professional training victims of the sins of omission and commission of Elementary and Secondary Schools, and as the case now stands, so far as geography is concerned, Normal Training Schools are called upon to supply the defects of early instruction and to prepare the student to teach. Moreover, both of these tasks must be accomplished within a narrow time limitation. That the author appreciates this situation is evident from the simple concrete fashion in which he presents his thesis, and the practical character of its development.

In the twelve weeks' course here outlined Mr. Jefferson devotes his instruction to the Distribution of Man upon the earth, and to Climate, one of the controlling factors of that distribution. Hand in hand with class instruction are daily exercises planned to make the student familiar with the weather elements, to test and strengthen his judgment concerning their effect upon his life, and to clarify the relation of his individual experience with the general laws whose effect on the earth at large he is studying. There are probably no phenomena about which young teachers show more ignorance than those connected with the general subject of climate. For this reason such a definite treatment, embodying a close study of maps as well as of daily weather happenings is destined to be of distinct service. The author has shown admirable restraint in confining this brief course to a definite topic and its applications. A teacher thus carefully trained in the use of maps and alert in his observation has the best possible foundation for the future culture his experience will bring him. If all teachers of geography could become familiar with the subject as presented in this admirable book the teaching of elementary geography would be on a distinctly higher plane.

C. W. HOTCHKISS.

PHYSICAL GEOGRAPHY

La Sismologie moderne. Les tremblements de terre. Par Comte de Montessus de Ballore. xx and 284 pp. Maps, ills. Armand Colin, Paris, 1911. 4 fr. 7½ x 4½.

Among the more highly civilized nations France is almost alone in having no semi-popular work upon earthquakes from an authoritative source. If this is to be explained by a belief that the pedestal of France is entirely stable so that the convulsions of the earth are without an intimate practical interest to her people, the idea should have been dispelled when on June 11, 1909, the district of Provence was strongly shaken by earthquakes. General interest in earthquakes having now been aroused by the recent destruction of Messina, the time is opportune for the appearance of a popular work written by one of the world's first authorities in this field and one fortunately gifted with a facile pen.

The earlier chapters are given to the evolution of earthquake apparatus, and in chapter V, which immediately follows, there is found the best general treatment in small compass of the multiple nature of earthquake waves as determined by both theoretical and mathematical methods on the one hand, and by instrumental and observational studies upon the other.

In chapter VI, which treats of the seat of the disturbance (*foyer*), the absurdity of the assumption of the earlier Mallet school that the shocks radiate from a definite point, is pointed out; though it is none the less evident that there is some hesitation in fully applying the newer explanation to which the Count gives his adhesion in the introduction, viz., "that the earthquake results from those large earth stresses which have elevated the mountains and have folded, broken and slid the rock strata one over the other." The earthquakes of Ischia (1883), of California (1906) and Assam (1897) are taken to represent three types of disturbance: the volcanic, movements localized along an extended line of fracture, and the mass movement of a large block. "These three distinct cases," the author states, "represent all possible combinations of the nature of earthquakes as regards the form of the epicentral region, and one sees that the old idea of the epicenter in its geometric sense applies to the first case only." To the reviewer it does not appear to be proven that the three cases differ in any essential respect, the apparently extinct Monte Epomeo having made no response to the Ischian earthquake of 1883, and Johnston-Lavis having shown that the site of Casamicola lies at the intersection of important fractures upon the island.

In succeeding chapters earth sounds either accompanied or unaccompanied by shocks, aftershocks, sea-quakes, seismic geography, the relation of earthquakes to earth relief, and the effect of shocks upon the appearance of the ground, are one after the other discussed in an able manner. A quite valuable chapter is devoted to exploding many supposed relationships of earthquakes; as, for example, to the phases of the moon, to the time of the day, to the season of the year, etc. An attempt is made to correlate the great earthquake belts of the globe with the mountain arcs of Suess's Pacific type, to which in the main

XUM

they correspond well. Though these belts thus appear to correspond to belts of folded strata, it is not, we believe, to be concluded that they are on this account the direct expression of the folding process, but are, on the contrary, a consequence of faulting much nearer to the surface.

The concluding chapters treat of the constitution of the earth's interior and of proper earthquake construction. When in accepting Professor Wiechert's supposed zones, composing the earth's core, the Count says that "the progress of observations can without doubt modify in some proportions the thickness of these diverse zones, but it is not probable that they should be later changed in any essential way, since this succession has been deduced from experiment without the intervention of theories or hypotheses," we believe he goes too far. In our belief there are several more or less unconscious hypotheses introduced in interpreting the earthquake diagrams which enter in an important way into the conclusions.

It will thus be seen that "Modern Seismology" is not a mere outline of the Count's larger manuals, but is written along original lines and is a valuable contribution to geophysics. WILLIAM HERBERT HOBBS.

OTHER BOOKS RECEIVED

These notes do not preclude more extended reference later

NORTH AMERICA

PHILIPSE MANOR HALL AT YONKERS, N. Y. The Site, the Building, and Its Occupants. By Edward Hagaman Hall. 255 pp. Ills. American Scenic & Historic Preservation Society, New York, 1912. 7½ x 5. [This delightful book gives the history and romance that centers in and around one of the most important American relics of seventeenth and eighteenth century times. It was here that Col. George Washington, who had won distinction in the French and Indian war, sought the hand of Mary Philipse, esteemed as one of the most beautiful and accomplished young women in the Colony of New York, only to learn that her promise had been given to Col. Roger Morris. Philipse Manor Hall is now maintained and preserved as an historic monument.]

BIRDS AND MAMMALS OF THE 1909 ALEXANDER ALASKA EXPEDITION. By Harry S. Swarth. 161 pp. Maps, ills. Univ. of California Publications in Zoology, Vol. 7, No. 2, 1911. Berkeley. 10½ x 7. [The Expedition was sent out at the cost of Miss Annie M. Alexandre to explore parts of the Sitka district not covered by the expedition of 1907. Sixteen islands and six points on the mainland were visited. This report contains a report on the localities visited, check lists and descriptions of 137 birds and 27 mammals collected, and remarks on their distribution.]

REVIEW OF HISTORICAL PUBLICATIONS RELATING TO CANADA. University of Toronto Studies. Vol. 15, 1911, xi and 220 pp. Index. Publications of 1910. Vol. 16, 1912, xiii and 211 pp. Index. Publications of 1911. Edited by George M. Wrong and W. Stewart Wallace. University Press, Toronto. $1.50 each. 10½ x 7. [Well written reviews of current publications relating to Canada and treating of its history, economics, geography, statistics, archæology, ethnology, folk-lore, law, education and bibliography.]

THE YEAR BOOK OF BRITISH COLUMBIA AND MANUAL OF PROVINCIAL INFORMATION. By R. E. Gosnell. 358 pp. Ills., index. Published by Authority Legislative Assembly, B. C. Victoria, B. C., 1911. $1. 8½ x 6. [A work of reference in respect to matters of general interest relating to British Columbia.]

AMONG THE ESKIMOS OF LABRADOR. A Record of Five Years' Close Intercourse with the Eskimo Tribes of Labrador. By S. K. Hutton. xviii and 340 pp. Maps, ills. J. B. Lippincott Co., Philadelphia, 1912. $3.50. 9 x 6. [The book gives a plain picture of the Eskimos of Labrador, as the author saw them for years, in their homes, at their work, and on their hunting and other journeys. It embraces all phases of their life and describes their bleak habitat. Copiously illustrated with well-chosen photo-engravings.]

XUM

SOUTH AND CENTRAL AMERICA

NOTES DE VOYAGE DANS L'AMÉRIQUE DU SUD. Argentine-Uruguay-Brésil. Par G. Clemenceau. 273 pp. Hachette et Cie, Paris, 1911. Fr. 3.50. 7½ x 4½. [The English Edition of this book was reviewed in the June *Bulletin*, pp. 455-6.]

DOCUMENTOS RELATIVOS Á LA CONTROVERSIA DE LIMITES CON LA REPUBLICA DE PANAMÁ. 113 pp. Secretaría de Relaciones Exteriores. República de Costa Rica. San José, 1909.

THE ANTIQUITIES OF MANABI, ECUADOR. Final Report. By Marshall H. Saville. 284 pp. Map, ills. Contr. to South American Archeology, Vol. 2. The George G. Heye Expedition. New York, 1910. 13 x 10.

DÉTERMINATION DE L'ALTITUDE DU MONT HUASCARAN (ANDES DU PÉROU). Exécutée en 1909 sur la demande de Madame F. Bullock-Workman par la Société Générale d'Études et de Travaux Topographiques. Compte rendue de la Mission. 48 pp. Maps, ills. Henry Barrère, Paris, 1911. 15 x 11½.

AFRICA

LA FRANCE ET LA TURQUIE DANS LE SAHARA ORIENTAL. Par E. Rouard de Card. 55 pp. Maps. A. Pedone and J. Gamber, Paris, 1910. 10 x 6½. [The author is professor of law at the University of Toulouse. Since 1897 he has written much on the relations of France and Spain with the North Africa Countries. The present work is an historical relation of the expedition and operations of France and Turkey in the Eastern Sahara.]

ASIA

A HISTORY OF CIVILIZATION IN PALESTINE. By R. A. S. Macalister. Cambridge Manuals of Science and Literature. viii and 139 pp. Map, ills., index. G. P. Putnam's Sons, New York, 1912. 1s. 6½ x 5. [A very readable short history by the former Director of Excavations, Palestine Exploration Fund.]

SPORT ON THE NILGIRIS AND IN WYNAAD. By F. W. F. Fletcher. xvii and 455 pp. Map, ills., appendices. Macmillan Co., New York, 1911. $3.75. 9 x 6. [A good account of the game animals and the chase in a large mountain district in the southwestern part of India, including the elephant, tiger, leopard, bison, bear, wild goat, sambur, deer, wild dog and other game. The book is especially noteworthy for its careful and interesting descriptions of the habits of the animals hunted.]

THE RAILWAYS OF JAPAN. 72 pp. Maps, ills. Director, General Administration Dept., Imperial Government Railways of Japan. Tokio. 10½ x 14½. [An official account of the railroads of Japan, with full text of the railroad law. Finely illustrated.]

IMPERIAL GOVERNMENT RAILWAYS OF JAPAN. (Also private Railways in Japan and the South Manchuria Railways.) Annual Report for the Year ended March 31st, 1909. 35 pp. of text. 136 pp. of tables and diagrams. Maps. Kondo Shoten Press, Tokyo. 12 x 8½.

TRAVELS AND STUDIES IN THE NEARER EAST. By A. T. Olmstead, B. B. Charles and J. E. Wrench. Vol. 1, Part II: Hittite Inscriptions. 49 pp. Ills. Cornell Expedition to Asia Minor and the Assyro-Babylonian Orient. Andrus & Church, Ithaca, N. Y. $1.50. 12½ x 9½.

AUSTRALIA

DIE TOTEMISTISCHEN KULTE DER ARANDA- UND LORITJA-STÄMME. II. Abteilung: Die Totemistischen Kulte des Loritja-Stammes. Dargestellt von Carl Strehlow. 75 pp. Ills. *Veröffentl. aus dem Städtischen Völker-Museum, Frankfurt am Main.* Joseph Baer & Co., 1911. Mk. 12. 11 x 8½

EUROPE

EUROPA'S CHILDHOOD AND GROWTH; an Historical Geography of Europe. By A. J. Berry. 281 pp. Ills. Sir Isaac Pitman & Sons, Ltd., London, 1912. 2s. 7 x 5. [A reader for young students.]

THE MAKING OF LONDON. By Sir Laurence Gomme. 255 pp. Ills., index. Clarendon Press, Oxford, 1912. $1.15. 7½ x 5. [A lucid and able account of the evolution of London from prehistoric times, as very dimly revealed by finds

dug out of London's site, to the present Empire City. The work is not only solid but also full of interest and information for the general reader.]

BUCKINGHAMSHIRE. By A. Morley Davies. xii and 222 pp. MIDLOTHIAN. By Alex. McCallum. x and 208 pp. NORTHAMPTONSHIRE. By M. W. Brown. xii and 215 pp. Maps and ills. in each. Cambridge County Geographies. G. P. Putnam's Sons, New York, 1911. 45 cents each. 7½ x 5 each.

DIE DEUTSCHEN ORTSNAMEN IM NORDOSTDEUTSCHEN KOLONIALGEBIET. Von Prof. Dr. F. Curschmann. Forschungen zur deutschen Landes- und Volkskunde, Vol. 19, No. 2, pp. 93-183. J. Engelhorn, Stuttgart, 1910. Mk. 5. 9 x 6½. [A study of place names in North East Germany from the earliest recorded German migration into that territory.]

THE RUSSIAN YEAR-BOOK FOR 1912. Compiled and Edited by Howard P. Kennard, assisted by Netta Peacock. xx and 822 pp. Map, ill. Eyre & Spottiswoode, Ltd., London, 1912. 10s. 6d. 8 x 5½. [The second issue of this year-book. This new source of information about Russia deserves the encouragement and support of all who are interested in the resources and activities of the Russian Empire. On p. 768 is a scheme of two alphabets for transliteration into English. Russia's trade is voluminously treated but not adequately as relates to the United States.]

PREHISTORIC THESSALY. Being Some Account of Recent Excavations and Explorations in North-Eastern Greece from Lake Kopais to the Borders of Macedonia. By A. J. B. Wace and M. S. Thompson. xv and 272 pp. Map, ills., appendices, index. University Press, Cambridge, 1912. 18s. 12 x 9½. [The volume collects all the archæological evidence as yet available for the prehistoric period in N. E. Greece.]

LA SISMICITÀ ALL' ISOLA DI USTICA E IL PERIODO MARZO-APRILE 1906. Per G. Martinelli. Estratto dagli *Ann. dell' Uffico* Centrale Meteorol. e Geodinamico Italiano, Vol. 30, Part 1. 16 pp. Ills. Giovanni Bertero, Rome, 1910. 13 x 9½.

CRIMEA. By E. N. Orlowska. In Russian. 211 pp. Map, ills. J. D. Sytin, Moscow, 1911. Ruble 0.50. 9 x 5½.

THE VOLGA. By A. Lepeszynski and B. Dobrynin. Edited by A. A. Kruber. In Russian. 279 pp. Map, ills. J. D. Sytin, Moscow, 1911. Ruble 0.50. 9 x 6.

PHYSICAL GEOGRAPHY

THE ORIGIN OF EARTHQUAKES. By Charles Davison. Cambridge Manuals of Science and Literature. viii and 144 pp. Maps, ills., index. G. P. Putnam's Sons, New York, 1912. 1s. 6½ x 5. [Considers the origin of different classes of earthquakes and fully describes one or two types of each.]

ROCKS AND THEIR ORIGINS. By Grenville A. J. Cole. Cambridge Manuals of Science and Literature. viii and 175 pp. Ills., index. G. P. Putnam's Sons, New York, 1912. 1s. 6½ x 5. [For the general reader. Tells about rocks in general, lists the common rocks that form them and has chapters on the limestones, sandstones, clays, shales, slates and igneous and metamorphic rocks. A useful little book. Those who read it carefully will find more intelligent enjoyment in observing rocks, whose study is an important branch of natural history.]

STUDIES IN TERRESTRIAL MAGNETISM. By C. Chree. Macmillan's Science Monographs. xii and 206 pp. Diagrams, index. Macmillan Co., New York, 1912. $1.60. 9½ x 6. [A book for the specialist, giving a connected account of this distinguished authority's own original work in Terrestrial Magnetism and referring to the work of others only as far as is necessary.]

PHYSICAL GEOGRAPHY FOR SOUTH AFRICAN SCHOOLS. By Alex. L. du Toit. xii and 250 pp. Maps, ills., index. G. P. Putnam's Sons, New York, 1912. $1.40. 7½ x 5½. [An excellent little work supplying a concise account of the processes of physical geography, the phenomena being especially illustrated by South African examples.]

GENERAL

DIE BERGZEICHNUNG AUF DEN ÄLTEREN KARTEN. Ihr Verhältnis zur darstellenden Kunst. Von Joseph Röger. iii and 80 pp. Ills. Theodor Riedels Buchhandlung, München, 1910. Mk. 2.50. 8 x 5½. [An interesting study of the development of the representation of mountain forms on early maps.]

TABLES FOR THE PROJECTION OF GRATICULES FOR MAPS ON THE SCALE OF 1:1,000,000. Prepared by the Geographical Section of the General Staff, War Office. 6 pp. London, 1910. 10½ x 7.

AUF EISBÄREN UND MOSCHUSOCHSEN. Tagebuchblätter der Jagderlebnisse in Ostgrönland. Von Rudolf Kmunke. x and 122 pp. Map, ills. Wilhelm Frick, Wien, 1910. Mk. 10. 10 x 7½. [A spirited account of the author's hunting adventures in the waters of Greenland Sea and along the East coast of Greenland.]

THE SWEET POTATO. By B. H. A. Groth. *Contr. from Botan. Laboratory of the Univ. of Pennsylvania*, Vol. 4, No. 1. 104 pp. Ills. Univ. of Pennsylvania, 1911. 10 x 7.

CURRENT GEOGRAPHICAL PAPERS

NORTH AMERICA

UNSTEAD, J. F. The Climatic Limits of Wheat Cultivation, with Special Reference to North America. Map, diagrams. *Geogr. Journ.*, Vol. 39, 1912, No. 4, pp. 347-366, No. 5, pp. 421-446.

United States

ATWOOD, W. W. A Geographic Study of the Mesa Verde. Plan. *Annals Assoc. Amer. Geogr.*, Vol. 1, 1911, pp. 95-100.

BARROWS, H. K., AND C. C. BABB. Water Resources of the Penobscot R. Basin, Me. 285 pp. Maps, ills. *Wat. Supp. Pap. 279, U. S. Geol. Surv.*, 1912.

BENT, A. C. Notes on Birds . . during a brief Visit to the Aleutian Is. and Bering Sea in 1911. 29 pp. *Smiths. Misc. Coll.*, Vol. 56, No. 32. 1912.

BLACKWELDER, E. A Reconnaissance of the Phosphate Deposits in Western Wyoming. Maps, geol. sec. *Bull. 470, U. S. Geol. Surv.* pp. 452-481. 1911.

BLAIR, W. R. Free Air Data. Sounding Balloon Ascensions at Indianapolis, Omaha, and Huron. Maps, diagrams. *Bull. Mt. Weather Observ.*, Vol. 4, 1912, Part 4, pp. 183-304.

BURR, G. L. New England's Place in the History of Witchcraft. *Proc. Amer. Antiquar. Soc.*, Vol. 21, 1911, Part 2, pp. 185-217.

CLARK, W. B. Summary Final Report on the Work of the Highway Division of the Maryland Geological Survey 1898-1910. Map. *Maryl. Geol. Surv.*, Vol. 9, 1911, pp. 81-120.

CLARK, W. B., A. B. BIBBINS, AND E. W. BERRY. The Lower Cretaceous Deposits of Maryland. 622 pp. Maps, ills., index. *Maryl. Geol. Surv.*, 1911.

CLARK, W. E. Annual Report of Governor of Alaska on Alaska Game Law 1911. 12 pp. *Circ. No. 85, Bur. Biol. Surv.*, U. S. Dept. Agric., 1912.

COMSTOCK, C. W. Water Supply of Colorado. *Proc. Colo. Sci. Soc.*, Vol. 10, 1912, Reports 1-8, pp. 123-129. Denver.

CRAWFORD, R. D. Preliminary Report on Geology of the Monarch Mining District, Chaffee Co., Col. 78 pp. Maps, ills., index. *Colo. Geol. Surv., Bull. 1*, 1909. Denver, 1910.

CROSBY, W. W. Third Report on State Highway Construction from Jan. 1, 1908, to Jan. 1, 1910. Map, ills. *Maryl. Geol. Surv.*, Vol. 9, 1911, pp. 33-77.

DALE, T. N. Supplementary Notes on the Commercial Granites of Mass. Map, diagrams. *Bull. 470, U. S. Geol. Surv.* pp. 240-288. 1911.

LAMB, W. A., W. B. FREEMAN, AND F. F. HENSHAW. Surface Water Supply of U. S. 1909. Part VI. Missouri River Basin. 291 pp. Ills., index. *Wat. Supp. Pap. 266, U. S. Geol. Surv.*, 1911.

LEE, W. T. Extinct Volcanoes of Northeast New Mexico. Ills. *Amer. Forestr.*, June, 1912. pp. 357-365.

LOGAN, W. N. Structural Materials of Mississippi. Prelim. Rept. 78 pp. Ills. *Bull. No. 9 Miss. State Geol. Surv.*, 1911.

XUM

LOUGHLIN, G. F. The Gabbros and Associated Rocks at Preston, Conn. 158 pp. Ills., maps, index. *Bull. 492, U. S. Geol. Surv.*, 1912.

LOWE, E. N. Preliminary Study of Soils of Mississippi. 220 pp. Ills. *Bull. No. 8, Miss. State Geol. Surv.*, 1911.

LOWIE, R. H. Some Problems in the Ethnology of the Crow and Village Indians. *Amer. Anthrop.*, Vol. 14, 1912, No. 1, pp. 60-71.

LUTHER, D. D. Geology of the Honeoye-Wayland Quadrangles. 29 pp. Maps, index. *New York State Mus. Bul. 152*, Albany, 1911.

MCCORMICK, R. R. The Use of the Great Lakes. *Journ. Western Soc. Engin.*, Vol. 17, 1912, No. 2, pp. 114-146.

MACFARLANE, C. T. The Erie Canal. *Journ. of Geogr.*, Vol. 10, 1912, No. 7, pp. 219-228.

MACFARLANE, J. J. A Ten-Year Comparison of the U. S. Exports to and Imports from the Principal Commercial Countries. Ills. *Commerc. Amer.*, Vol. 8, 1912, No. 10, pp. 7-11.

MACFARLANE, J. J. A Comparative Study of the Imports and Exports of Great Britain, Germany and the United States in the Last Thirty Years. Diagrams. *Commerc. Amer.*, Vol. 8, 1912, No. 9, pp. 9-13.

MACFARLANE, J. J. Industrial Philadelphia. *Commerc. Amer.*, Vol. 8, 1912, No. 11, pp. 7-13.

MARSHALL, R. B. Results of Spirit Leveling in Illinois. 1909 and 1910. 115 pp. Ills. *Bull. 493, U. S. Geol. Surv.* 1911.

SHATTUCK, G. B. The Environment of Vassar College. Edited by ———. Ills. 32 pp. Reprinted from *Vassar Miscellany*, May, 1907.

SHIMEK, B. Pleistocene of Sioux Falls, South Dakota, and Vicinity. Map, ills. *Bull. Geol. Soc. of Amer.*, Vol. 23, 1912, No. 1, pp. 125-154.

SINGLEWALD, J. T. Report on Iron Ores of Maryland, with Account of Iron Industry. Maps, ills. *Maryl. Geol. Surv.*, Vol. 9, 1912, pp. 123-327.

SPRINGER, J. F. Overcoming Difficulties in Building the New Water Supply System for New York City. (Catskill Aqueduct.) Ills. *Commerc. Amer.*, Vol. 8, 1912, No. 10, pp. 13-15.

STAVENHAGEN, W. Die Küstenverteidigung der Vereinigten Staaten Amerikas. 10 pp. Map. Sonderabdruck aus den *Mitt. über Gegenstände des Artillerie- und Geniewesens*, 1911. No. 10. Vienna.

STOLLER, J. H. Glacial Geology of the Schenectady Quadrangle. 44 pp. Maps, ills., index. *New York State Mus. Bull. 154*, Albany, 1911.

STONE, R. W. Coal near the Black Hills Wyoming, South Dakota. 66 pp. Maps, ills., index. *Bull. 499, U. S. Geol. Surv.* 1912.

TARR, R. S. The Larger Physiographic Features of New York. *Journ. of Geogr.*, Vol. 10, 1912, No. 7, pp. 209-213.

THOMPSON, E. H. A Kindlier Light on Early Spanish Rule in America. *Proc. Amer. Antiquar. Soc.*, Vol. 21, 1911, Part 2, pp. 277-283.

UDDEN, J. A. Geology and Mineral Resources of the Peoria Quadrangle. Ill. 103 pp. Maps, ills., geol. sections, index. *Bull. 506, U. S. Geol. Surv.* 1912.

VEATCH, O., AND L. W. STEPHENSON. Preliminary Report on the Geology of the Coastal Plain of Georgia. 466 pp. Maps, geol. sect., ills., index. *Bull. No. 26, Geol. Surv. of Georgia.* Atlanta. 1911.

VOTH, H. R. Brief Miscellaneous Hopi Papers. 149 pp. Ills. *Public. 157, Field Mus. Nat. Hist.*, Anthrop. Series, Vol. 11, 1912, No. 2.

WALRADT, H. F. Financial History of Connecticut from 1789 to 1861. 139 pp. *Trans. Conn. Acad. of Arts and Sci.*, Vol. 17, 1912, New Haven, Conn.

WEAVER, C. E. Geology and Ore Deposits of the Index Mining District. 96 pp. Maps. *Bull. No. 7, Wash. Geol. Surv.*, Olympia, 1912.

WEED, W. H. Copper Deposits of the Appalachian States. 166 pp. Maps, sections, diagrams, ills. *Bull. 455, U. S. Geol. Surv.* 1911.

WEGEMANN, C. H. Petroleum and Natural Gas in Wyoming. Maps, geol. section. *Bull. 471-A-3, U. S. Geol. Surv.* pp. 52-71. 1912.

WEIDMAN, S. Reconnoissance Soil Survey of Part of N. W. Wisconsin. 102 pp. Maps, geol. sect., ills., index. *Bull. No. 23, Econ. Series No. 14, Wis. Geol. and Nat. Hist. Surv.*, Madison, Wis. 1911.

WEIDMAN, S., AND P. O. WOOD. Reconnoissance Soil Survey of Marinette County. 44 pp. Maps, ills. *Bull. No. 24, Soil Series No. 1, Wisc. Geol. and Nat. Hist. Surv.*, Madison. 1911.

WILLIAMS, G. S. The Uses of the Great Lakes. *Offic. Proc. 19th Nat. Irrig. Congress*, Dec., 1911, pp. 101-107. Chicago, 1912.

WILSON, F. C. The Pueblo Indians of New Mexico. *Rep. 29th Ann. Lake Mohonk Confer. of Friends of the Indian*, etc., 1911, pp. 17-24.

WOOD, B. D. Gaging Stations . . U. S. Geol. Surv. 1888-1910 and Survey Publications Relating to Water Resources. Compiled by———. 102 pp. Index. *Water-Supp. Pap. 280.* 1912.

WOODRUFF, E. G. Petroleum and Natural Gas in Utah. *Bull. 471-A-4, U. S. Geol. Surv.*, pp. 72-101. 1912.

ZINN, G. A. Chicago's Waterways in Their Relation to Transportation. *Journ. West. Soc. of Engin.*, Vol. 17, 1912, No. 4, pp. 285-330.

—— Mineral Resources of the United States. 1910. Part 1—Metals. 796 pp. Map, diagrams and index. *U. S. Geol. Surv.*, 1911.

—— Mineral Resources of the U. S. 1910. Part II—Nonmetals. 1005 pp. Maps. U. S. Geol. Surv. 1911: BURCHARD, E. F. Cement. pp. 469-535; DAVIS, C. A. Peat. pp. 459-468; DAY, D. T. Petroleum. pp. 327-458; BURCHARD, E. F. Stone. pp. 643-682; HILL, B. Natural Gas. pp. 299-326; MIDDLETON, J. Clay-Working Industries. pp. 537-600; PARKER, E. W. Coal. Maps. pp. 5-242; PARKER, E. W. Coke. pp. 243-297.

—— Annual Report of the Art Commission of the City of New York for the Year 1910. 37 pp. Ills. 1912.

—— General Index to the Proceedings of the American Philosophical Society held at Philadelphia for Promoting Useful Knowledge. Vols. 1-50, 1838-1911. [Many references to geographical material.] 83 pp. *Amer. Philosoph. Soc.* 1912.

—— Prince George's County. 251 pp. Maps in case, ills., index. *Maryland Geol. Surv.*, Baltimore, 1911.

—— Population: Porto Rico. Number of Inhabitants, by Municipalities, and Barrios. 15 pp. Maps. *Bull. 13th Census U. S.* 1910, Bur. of Census.

—— Register of the Appalachian Mountain Club for 1912. 96 pp. Boston.

—— Report of the Chief of the Weather Bureau 1910-1911. 260 pp. Maps. *Weather Bur.*, U. S. Dept. of Agric., 1912.

—— Twenty-Third Annual Report on Statistics of Railways in the U. S. for Year ending June 30, 1910. 898 pp. Map, index. *Division of Statist. Interstate Commerce Comm.* Washington, 1912.

Canada

COLLIE, J. N. The Canadian Rockies North of Mount Robson. Ills. *Appalachia*, Vol. 12, 1912, No. 4, pp. 339-349. Boston.

DUGAS, G. Les pionniers de l'Ouest canadien. M. de la Vérendrye. [Notes on the explorations of Vérendrye, 1731-1744.] *Bull. Soc. Géogr. Québec*, Vol. 6, 1912, No. 2, pp. 92-97.

PALMER, H. The First Ascent of Grand Mountain. Ills. *Appalachia*, Vol. 12, 1912, No. 4, pp. 362-373. Boston.

STEWART, W. J. Report on Hydrographic Surveys. *Sess. Paper No. 38*, 1912. Rep. Dept. Naval Service, March 31, 1911, pp. 32-41. Ottawa.

TURNER, N. L. The Petroleum Industry of Canada. *Journ. and Proc., Hamilton Assoc.*, Session 1907-1908, No. 24, 1908. [Without pagination.] Hamilton, Canada.

WICHMANN, H. Die erweiterten Provinzen von Kanada. Map. *Pet. Mitt.*, Vol. 58, 1912, Juni-Heft, pp. 319.

—— Geographic Board of Canada. Decisions March-April, 1912. 8 pp. Extract from *Canada Gazette*, May 4, 1912. Ottawa.

—— Tide Tables for the Eastern Coasts of Canada for the Year 1912. Including the River and Gulf of St. Lawrence, the Atlantic Coast, the Bay of Fundy, Northumberland and Cabot Straits; and Information on Currents. 55 pp. *Tidal and Current Surv., Naval Service*, Ottawa, 1911.

XUM

Mexico

BELMAR, F. Memoria que el Secretario Perpetuo, Lic.—, presenta á la Sociedad Mexicana de Geografía y Estadística, y que comprende el período de 1910 á 1911. [A summary of the geographical work and publications of the Society and a list of national publications relating to geography and allied subjects in 1910 and 1911.] *Bol. Soc. Mexicana de Geogr. y Estad.*, Vol. 4, 1911, pp. 440-454 and 462-469.

BREKER, C. S. La Baja California, un país desierto y seco. *Bol. Soc. Mex. de Geogr. y Estad.*, Vol. 4, 1911, Nos. 11-14.

GONZÁLEZ, P. El calendario Azteca o la piedra del sol, con la interpretación de sus figuras. *Bol. Museo Nacion. de Arqueología.* Vol. 1, 1911, No. 6, pp. 97-99. Mexico.

—— Boletin de Estadística Fiscal 1910-11, Republica Mexicana, No. 366. 377 pp. Secret. de Estado y del Despacho de Hacienda. Credito Publico y Comercio, Mexico, 1912.

SOUTH AND CENTRAL AMERICA

Bolivia

BANDELIER, A. F. The Ruins at Tiahuanaco. *Proc. Amer. Antiquar. Soc.*, Vol. 21, 1911, Part 2, pp. 218-265.

—— Informe del Director General de Obras Publicas Dr. Aníbal Capriles, 1910-1911. Republica de Bolivia. [Railroad and telegraph development.] 211 pp. Maps, ills. La Paz, 1912.

Chile

FUENZALIDA, J. DEL C., AND H. POLAKOWSKY. Zur geographischen und geologischen Landesaufnahme der Republik Chile. Map. *Pet. Mitt.*, Vol. 58, 1912, Juni-Heft, 312-316.

—— Anuario Estadístico de la República de Chile, 1910. Territorio, Poblacion, Instruccion, Justicia, Culto, Beneficencia. 689 pp. Map, diagrams. *Ofic. Central de Estad.*, Santiago, 1912.

—— Anuario Estadístico de la República de Chile, 1910. Movimento Marítimo. 303 pp. *Ofic. Central de Estad.*, Santiago, 1911.

Colombia

PEITZ, W. M. Die Apostol. Präfektur Chocó in Colombia. Ills. *Kathol. Miss.*, Vol. 40, 1911/1912, No. 7, pp. 157-162.

Honduras

HAEBERLE, A. T. A Visit to the Department of Olancho, Honduras. Map, ills. *Bull. Pan Amer. Union*, Vol. 34, 1912, No. 5, pp. 588-606.

Venezuela

—— Coordenadas Geograficas determinadas por el Mapa Fisico y Politico de Venezuela. 35 pp. Tipogr. "Cosmos", Caracas, 1912.

AFRICA

The Continent and Parts of it

ACKER, P. Der Islam und die Kolonisierung Afrikas. *Jahrb. deutschen Kolonien*, Vol. 4, 1911, pp. 113-127. Essen.

HULOT. A propos de l'accord franco-allemand. Map. *La Géogr.*, Vol. 25, 1912, No. 1, pp. 34-43.

PARMENTIER, J. De Khartoum à Addis-Abeba. Map, ills. *La Géogr.*, Vol. 25, 1912, No. 4, pp. 231-246.

PEYRISSAC, L. La frontière Franco-Libérienne. Maps, ills. *Rev. de Géogr. Commerc.*, Vol. 38, 1912, Jan., pp. 19-40. Bordeaux.

SCHMICK, GEHEIMER OBERBAURAT. Die Wichtigkeit der Bewässerung in Deutsch-Südwestafrika und Deutsch-Ostafrika. *Jahrb. deutschen Kolonien*, Vol. 4, 1911, pp. 144-150. Essen.

WAUTERS, A. J. Les chemins de fer trans-africains. Map. *Mouv. Géogr.*, Vol. 28, No. 45, 1911, cols. 571-576.

WICHMANN, H. Das deutsch-französische Kamerun-Kongo-Abkommen vom 4. Nov., 1911. Map. *Pet. Mitt.*, Vol. 57, 1911, Dez. Heft, pp. 332-333.

—— Le Bangwelo et la frontière Anglo-Congolaise au sud de ce lac. Map. *Mouv. Géogr.*, Vol. 28, No. 44, 1911, cols. 559-562.

—— Der Handel der Schutzgebiete in Afrika. *Tropenpflanzer*, Vol. 16, 1912, No. 1, p. 50.

—— Herzog Adolf Friedrich zu Mecklenburg über seine "Inner-Afrika-Expedition 1910/11." Map. *Zeitschr. Gesell. f. Erdk. zu Berlin*, 1912, No. 1.

—— Franco-German Territorial Arrangement. Map. *Geogr. Journ.*, Vol. 38, No. 6, 1911, pp. 622-624.

—— Le projet de chemin de fer franco-allemand du Kamerun a l'Ubangi. *Mouv. Géogr.*, Vol. 29, 1912, No. 2, cols. 49-54.

Abyssinia

EDWARDS, F. A. The New Ethiopia. *Imp. & Asiat. Quart. Rev.*, Vol. 33, 1912, No. 66, pp. 328-360.

MONTANDON, G. Le Ghimirra. [In the basin of the Bako R., S. W. Abyssinia.] Map, ills. *La Géogr.*, Vol. 25, 1912, No. 1, pp. 1-20.

Belgian Congo

MAURITZEN, CAPITAINE. Le problème du Lac Kisale. Map. *Mouv. Géogr.*, Vol. 20, 1912, No. 20, cols. 301-305.

—— Les chemins de fer du bassin du Congo. Map. *Mouv. Géogr.*, Vol. 29, 1912, No. 18, cols. 277-281.

—— Messrs. C. A. and A. E. H. Reid's Surveys in the Northern Congo Basin. Map. *Geogr. Journ.*, Vol. 38, No. 6, 1911, pp. 591-592.

British East Africa

SOUL, J. Le climat du Kikouyou (Afrique orientale) et la culture du caféier. Map. *La Géogr.*, Vol. 24, 1911, No. 5, pp. 281-286.

Egypt

STEARNS, W. N. The Remaking of Egypt. The Nile Irrigation Project. Map, ills. *Quart. Journ. Univ. of North Dakota*, Vol. 2, 1912, No. 3, pp. 243-253.

WADE, A. The Eastern Desert of Egypt. Ills. From the *Quart. Journ. Geol. Soc.*, Vol. 67, 1911, pp. 238-262.

—— A List of Maps and Plans published up to March 1, 1910. Maps. 41 pp. *Survey Dept., Ministry of Finance, Egypt.* Cairo, 1910.

—— Ausdehnung und Erträge der Baumwollkultur in Ägypten 1895 bis 1909. *Tropenpf.*, Vol. 16, 1912, No. 1, p. 44.

—— List of Publications issued up to Dec. 31, 1909. 40 pp. *Survey Dept., Ministry of Finance, Egypt.* Cairo, 1910.

French Equatorial Africa

NZAMBA, G. Ce qu'il faut faire sur le littoral du Gabon. Map. *L'Afrique Franc.*, Vol. 22, 1912, No. 2, pp. 56-60.

ROUSSILHE, H. Mission hydrographique Congo-Oubangui-Sanga. *La Géogr.*, Vol. 25, 1912, No. 2, pp. 99-102.

—— Französisch-Aequatorial-Afrika im Jahre 1911. *Deutsche Kolonialzeitung*, Vol. 29, 1912, No. 2, p. 21.

French Sudan

GIRONCOURT, G. DE. Le sommet de la boucle du Niger. Maps, ills. *La Géogr.*, Vol. 25, 1912, No. 3, pp. 153-172.

LABATUT. Le Territoire Militaire du Tchad. (Kanem, le Lac Tchad, Ouadaï.) *Bull. Soc. Géogr. d'Alger et de l'Afrique du Nord*, Vol. 16, 1911, 2e Trim., pp. 119-153.

—— Mission de Gironcourt. *La Géogr.*, Vol. 25, 1912, No. 4, pp. 247-250.

German East Africa

OBST, E. Von Mkalama ins Land der Wakindiga. Ills. *Mitt. Geogr. Gesell. in Hamburg*, Vol. 26, 1912, No. 1, pp. 1-45.

OBST, E. Die Landschaften Issansu und Iramba. Vorläufiger Bericht (III.) der Ostafrika-Expedition der Hamburger Geogr. Gesell. Ills. *Mitt. Geogr. Gesell. in Hamburg*, Vol. 26, 1912, No. 2, pp. 108-132.

MEYER, H. Auf neuen Wegen durch Ruanda und Urundi. Map. *Zeitschr. Gesell. für Erdk. zu Berlin*, No. 2, 1912, pp. 107-135.

Tripoli

ASSADA, I. La Tripolitaine. Map. *La Géogr.*, Vol. 25, 1912, No. 3, pp. 185-192.

JAJA, G. Sul valore economico della Tripolitania. *Boll. Soc. Geogr. Ital.*, Vol. 12, 1911, pp. 1345-1375.

PERA, G. Importanza delle vie carovaniere in Tripolitania ed in Cirenaica. *L'Esplor. Comm.*, Vol. 27, 1912, No. 1, pp. 1-5.

STAVENHAGEN, W. Tripolitanien und der Krieg 1911. Maps. *Deutsche Rundschau f. Geogr.*, Vol. 34, No. 3, pp. 122-134.

TERMICOURT, L. H. DE. La Tripolitaine. *Bull. Soc. Belge d'Études Col.*, Vol. 19, 1912, No. 2, pp. 107-134.

VIGONI, P. Tripolitania e Cirenaica. Impressioni e Studi. *L'Esplor. Commerc.*, Vol. 26, 1911, Fasc. 12, pp. 457-474. Milan.

Union of South Africa

BURTT-DAVY, J. The Maize Industry of South Africa. *Agric. Journ. of the Union of South Africa*, Vol. 2, No. 5, 1911, pp. 588-601. Pretoria.

—— Fifteenth Annual Report of the Geological Commission. 1910. 142 pp. Maps, ills., index. *Dept. of Mines, Cape of Good Hope.* Cape Town.

ASIA

The Continent and Parts of it

BAILEY, F. M. Journey Through a Portion of South-Eastern Tibet and the Mishmi Hills. Map. *Geogr. Journ.*, Vol. 39, 1912, No. 4, pp. 334-347; and *Scott Geogr. Mag.*, Vol. 28, 1912, No. 4, pp. 189-203.

DAVIS, A. P. Irrigation in Western Asia. *Offic. Proc. 19th Nat. Irrig. Congress*, Dec., 1911, pp. 49-53. Chicago, 1912.

HELFFERICH, E. Die weitere Entwicklung der Kautschukkultur in Südostasien. *Tropenfl.*, Vol. 16, 1912, No. 1, pp. 15-34, No. 2, pp. 73-87.

KOHL, J. G. Asia and America. An Historical Disquisition Concerning the Ideas which Former Geographers had About the Geographical Relation and Connection of the Old and New World. Maps. *Proc. Amer. Antiquar. Soc.*, Vol. 21, 1911, Part 2, pp. 284-338.

China

TANANT, C. E. La Population de la Chine. *La Géogr.*, Vol. 25, 1912, No. 2, pp. 103-104.

Korea

SIMON, E. Ein alter Plan der beiden Hauptstädte des Ehemaligen Königreiches Chusan. [The seaport Naha and the neighboring city of Shuri, the former residence of the kings of Korea.] *T'Oung Pao*, Vol. 12, 1911, No. 5, pp. 728-735. Leiden.

—— Annual Reports on Reforms and Progress in Korea. 1907, 140 pp.; for 1908-9, 215 pp.; for 1909-10, 194 pp. Maps, ills. Seoul, 1908, 1909, 1910.

AUSTRALASIA AND OCEANIA

Australia

CARNE, J. E. The Tin-Mining Industry and the Distribution of Tin Ores in New South Wales. 378 pp. Maps, index. *Mineral Resources No. 14, Geol. Surv., New South Wales.* Sydney, 1911.

—— Port Phillip mit den Häfen Melbourne und Geelong. Ills. *Ann. Hydrogr. u. Mar. Met.*, Vol. 40, 1912, No. 5, pp. 247-265.

—— Report by the Surveyor General for the Year Ending 30th June, 1911. 22 pp. Map. *Dept. of Lands and Surveys, Western Australia.* Perth, 1911.

New Zealand

FRASER, M. The New Zealand Official Year-Book 1911. 1005 pp. Maps, index. Wellington, N. Z.

LEE, L. New Zealand. *Journ. and Proc. Hamilton Assoc.*, Session 1907-1908, No. 24, 1908. [Without pagination.] Hamilton, Canada.

SPEIGHT, R. Mount Arrowsmith District: Study in Physiography and Plant Ecology. Map, ills. *Trans. New Zealand Inst.*, Vol. 43, 1910, pp. 315-378.

Dutch New Guinea

HELDRING, O. G. De Zuidkust van Nieuw-Guinea. Maps, ills. *Jaarb. van het Mijnwezen in Nederl. Oost-Indië*, Vol. 38, 1909, pp. 83-203. Martinus Nijhoff, The Hague, 1910.

VAN GELDER, J. K. Verslag omtrent eene geologische verkenning van de Mamberamo-Rivier op Nieuw-Guinea. Maps, ills. *Jaarb. van het Mijnwezen in Nederl. Oost-Indië*, Vol. 39, 1910, pp. 87-112. Martinus Nijhoff, The Hague, 1912.

VIEGEN, J. Oorsprongs- en Afstammings- legenden van den Marindinees (Zuid Nieuw-Guinea). *Tijdschr. Kon. Nederl. Aardrijksk. Genoot.*, Tweede Serie, Deel 29, 1912, No. 2, pp. 137-153.

—— De Exporatie van Nieuw-Guinea. *Tijdschr. Kon. Nederl. Aardrijksk. Genoot.*, Tweede Serie, Deel 29, 1912, No. 2, pp. 210-220.

Samoa

SCHULTZ, E. Samoanisches Familien-, Immobiliar- und Erbrecht. 43 pp. Apia, 1911.

EUROPE

The Continent and Parts of it

HOSSEUS, C. C. Alpinist und Alpenflora. [Includes table showing range in altitude above sea, in temperature and in latitude of leading varieties of plants.] Auszug aus einem Vortrag gehalten im Akademischen Alpenverein, Berlin.

PENCK, A. Richard Lepsius über die Einheit und die Ursachen der diluvialen Eiszeit in den Alpen. *Zeitschr. f. Gletscherk.*, Vol. 6, 1912, No. 3, pp. 161-189.

Austria

FRIEDRICH, W. Die Historische Geographie Böhmens bis zum Beginne der deutschen kolonisation. 209 pp. Maps. *Abhandl. k.k. Geogr. Gesell. in Wien*, Vol. 9, 1912, No. 3.

KREBS, N. Die landeskundliche Literatur der österreichischen Karstländer in den Jahren 1905-1908 (1909). [Reprint.] pp. 70-112.

France

LAROZE, J. Le Port de Bordeaux. Plan. *Rev. de Géogr. Commerc.*, Vol. 38, 1912, Jan., pp. 5-10. Bordeaux.

—— Service des grandes forces hydrauliques dans la région des Alpes. Vol. 4, Resultats des Études et Travaux à la fin de 1910. 556 pp. Ills. [Maps and levelings in two cases.] Direction de l'Hydraulique, Minist. de l'Agric., Paris, 1911.

Germany

WERTH, E. Die äussersten Jungendmoränen in Norddeutschland und ihre Beziehungen zur Nordgrenze und zum Alter des Löss. Map. *Zeitschr. für Gletscherk.*, Vol. 6, 1912, No. 4, pp. 250-277.

—— Jahrbuch für Bremische Statistik. 1911. Zur Statistik des Schiffs- und Warenverkehrs im Jahre 1911. 375 pp. *Bremischen Statist. Amt.*, 1912.

—— Zeitschrift des Königlich Preussischen Statistischen Landesamts. Vol. 51, 1911, 1-4. Abteil. pp. 339-486. Berlin. [Statistics for 1910.]

XUM

Italy

BARBARICH, E. La Tuscia Romana. [The region between Rome and Lake Bolsena to the N. and W. of the Tiber.] Maps, profiles, ills. *Boll. Soc. Geogr. Ital.*, Vol. 1, 1912, No. 3, pp. 227-254.

BORGHESANI, G. A. R. The New Italian Forest Policy. Ills. *Amer. Forestry*, Vol. 18, 1912, No. 3, pp. 147-155.

FISCHER, P. D. Italien als Mittelmeermacht. *Geogr. Zeitschr.*, Vol. 18, 1912, No. 3, pp. 129-138.

KRANZ, W. Vulkanismus und Tektonik im Becken von Neapel. Maps, ills. *Pet. Mitt.*, Vol. 58, 1912, März-Heft, pp. 131-135, April-Heft, pp. 203-208, Mai-Heft, pp. 258-264.

RÜHL, A. Elba. *Zeitschr. Gesell. f. Erdk. zu Berlin*, 1912, No. 4, pp. 288-297.

—— Annuario Statistico Italiano, Vol. 1, 1911, Seconda Serie. 347 pp. Maps, index. *Minist. di Agric. Industr. e Commerc.*, Rome, 1912.

Norway

—— Norwegian Whaling Industry in 1911. *Board of Trade Journ.*, Vol. 76, 1912, No. 797, pp. 519-521.

—— Jahrbuch des Norwegischen Meteorologischen Instituts für 1905, 120 pp.; 1906, 122 pp.; 1907, 122 pp.; 1908, 122 pp.; 1909, 122 pp.; 1910, 122 pp.

Switzerland

DAUZAT, A. Les Chemins de fer de Montagne dans les Alpes vers le sommet de la Jungfrau. Map, ills. *A Travers le Monde*, Vol. 18, 1912, No. 20.

The United Kingdom

DEMANGEON, A. La navigation intérieure en Grande-Bretagne. *Ann. de Géogr.*, Vol. 21, 1912, No. 115, pp. 40-49.

POLAR REGIONS

Arctic

KOCH, J. P. Danmark-Ekspeditionens Kort. Maps, ills. *Geogr. Tidskr.*, Vol. 21, 1912, No. 5, pp. 167-177.

—— Danmark-Ekspeditionen til Grønlands Nordøstkyst 1906-1908. [Lists of plants, insects, plankton, etc., collected in N. E. Greenland and adjoining waters.] 346 pp. Ills. *Meddelelser om Grønland*, Vol. 43, 1911. Copenhagen.

—— Meddelelser om Grønland. Vol. 47. [Geological, medical and other studies in S. W. Greenland.] 387 pp. Map, ills. *Komm. for Ledelsen af de Geol. og Geogr. Undersøgelser i Grønland.* Copenhaven, 1911.

CARTOGRAPHICAL

BECKER, A. Kartenkunde. *Kartogr. und Schulgeogr. Zeitschr.*, No. 1, 1912, pp. 3-4. Vienna.

GROLL, M. Alte und neue Seekarten. Maps. Sonder-Abdruck *Marine Rundschau, pp. 601-616.* Mittler & Son, Berlin.

PREISSLER, K. Wirtschaftsgeographische Karten. *Kartogr. und Schulgeogr. Zeitschr.*, No. 5, 1912, pp. 93-97. Vienna.

RANSOME, F. L. The Plane-Table in Detailed Geologic Mapping. *Econ. Geol.*, Vol. 7, 1912, No. 2, pp. 113-119.

ROTHAUG, J. G. Vogelschaubild und Karte. Map, ill. *Kartogr. und Schulgeogr. Zeitschr.*, No. 1, 1912, pp. 4-7. Vienna.

ROTHAUG, J. G. Stumme Karten und Kartenskizzen. *Kartogr. und Schulgeogr. Zeitschr.*, No. 1, 1912, pp. 9-12. Vienna.

ROTHAUG, J. G. Das Prinzip der Beleuchtung unserer Landkarten. Map. *Kartogr. und Schulgeogr. Zeitschr.*, No. 3, 1912, pp. 49-51. Vienna.

ROTHAUG, J. G. Über Farbentheorien. [Scientific use of color on maps.] Map. *Kartogr. und Schulgeogr. Zeitschr.*, No. 2, 1912, pp. 25-29. Vienna.

—— The Projection for the International Map of the World. *Geogr. Journ.*, Vol. 39, 1912, No. 5, pp. 468-469.

PHYSICAL GEOGRAPHY

BRAUN, F. Über die Landschaftsnatur der deutschen Weichselufer. *Ills. Deutsche Rundschau f. Geogr.*, Vol. 34, 1912, No. 7, pp. 314-324.

BUCHANAN, J. Y. Beobachtungen über die Einwirkung der Strahlung auf das Gletschereis. *Zeitschr. f. Gletscherk.*, Vol. 6, 1912, No. 3, pp. 189-196.

FOWLE, F. E. Smithsonian Physical Tables. xxxiv and 318 pp. Index. *Smiths. Miscell. Coll.*, Vol. 58, 1910, No. 1.

GALLÉ, P. H. Étude critique sur la méthode de prévision du temps de Guilbert. 25 pp. Diagrams. *Mededeel. en Verhandel. Kon. Nederl. Met. Inst.*, No. 102. Utrecht, 1912.

HARPER, R. M. The Relation of Climax Vegetation to Islands and Peninsulas. Reprinted from *Bull. of the Torrey Botanical Club*, Vol. 38, 1911, pp. 515-525.

MAURER, J., U. J. FRÜH. Die Wirkung der grossen Hitze und Dürrezeit 1911 auf die Seenverdunstung. *Pet. Mitt.*, Vol. 58, 1912, März-Heft, pp. 124-126.

NÖLKE, F. Wurde die Eiszeit durch eine Temperaturerniedrigung hervorgerufen oder nicht? *Pet. Mitt.*, Vol. 58, 1912, März-Heft, pp. 121-124.

PASSARGE, S. Physiologische Morphologie. Map, ills. *Mitt. Geogr. Gesell. in Hamburg*, Vol. 26, 1912, No. 2, pp. 133-337.

PERLEWITZ, P. Bestimmung der Windrichtung und Windgeschwindigkeit in der Höhe aus den Beobachtungen von Pilotballonen. Diagrams. *Ann. Hydrogr. u. Mar. Met.*, Vol. 40, 1912, No. 4, pp. 177-180.

NEW MAPS

EDITED BY THE ASSISTANT EDITOR

System Followed in Listing Maps.

Title. As on original, if possible. If lacking or incomplete, necessary matter enclosed in brackets.

Scale. Natural (unless otherwise on original). If no scale on original, approximate scale enclosed in brackets.

Coordinates. Approximate limiting coordinates of map given except when region explicitly defined by title. Where map-net lacking, coordinates, if possible of determination, given in brackets. All meridians referred to Greenwich. If map not oriented N., orientation given.

Colors. Number of tints of separate symbols, not number of color printings given. Black or basal color not considered a color.

Source. If map separately published, name of institution issuing it, place and date given. If a supplement, title of paper or book, author, periodical, volume, number, year and pages given.

Comment. Descriptive and critical. In brackets.

Regional Classification. Major political divisions the unit, as a rule, except for United States and Canada. Boundaries of continents according to Siever's *Länderkunde*, Kleine Ausgabe.

MAPS ISSUED BY UNITED STATES GOVERNMENT BUREAUS

U. S. COAST AND GEODETIC SURVEY

[N. B.—Only charts not enumerated in the Coast and Geodetic Survey "Catalogue of Charts, Coast Pilots and Tide Tables, 1911," listed here.]

Atlantic Coast

Monhegan Island to Cape Elizabeth, Maine. 1:80,000. 44°4′ - 43°31′ N.; 70°17′ - 69°18′ W. Chart No. 1205. March 1912. 50 cts.

[Covers, on the same scale, the greater portion of the region shown on Charts Nos. 105 and 106 without the shore topography, however.]

Chester River, Chesapeake Bay, Maryland. 1:40,000. 39°15.1′ - 38°57.4′ N.; 76°18.6′ - 75°55.0′ W. Chart No. 548. Feb. 1912. 50 cts.

James River, Chesapeake Bay, Virginia: Newport News to Jamestown. 1:40,000. 37°14.0′ - 36°52.5′ N.; 76°47.0′ - 76°24.5′ W. With one inset: Continuation of Nasemond River. 1:40,000. 36°52.7′ - 36°44.0′ N.; 76°35.7′ - 76°29.2′ W. Chart No. 529. Jan. 1912. 50 cts.

James River, Chesapeake Bay, Virginia: Jamestown Island to Jordan Point. 1:40,000. 37°20.4′ - 37°9.6′ N.; 77°13.7′ - 76°46.2′ W. With one inset: Con-

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tinuation of Chickahominy River. 1:40,000. 37°26.0′ - 37°20.3′ N.; 77°2.5′ - 76°52.0′ W. Chart No. 530. March 1912. 50 cts.

James River, Chesapeake Bay, Virginia: Jordan Point to Richmond. 1:20,000. 37°25.6′ - 37°17.3′ N.; 77°24.5′ - 77°13.2′ W. With two insets: Continuation of Appomattox River. 1:20,000. (1) 37°17.5′ - 37°13.7′ N.; 77°24.5′ - 77°21.0′ W. (2) 37°33.3′ - 37°25.0′ N.; 77°26.6′ - 77°24.2′ W. Chart No. 531. April 1912. 50 cts.

Pacific Coast

Northern Part [of] Cook Inlet. [Mercator's projection: mean meridional scale 1:200,000.] 61°33′ - 60°8′ N.; 152°46′ - 148°58′ W. Chart No. 8553. Jan. 1912. 50 cts.

Bays and Anchorages, South Coast, Alaska. (1) Larsen Bay, Kodiak Island. From surveys in 1908. 1:20,000. 57°33¾′ - 57°30½′ N.; 154°6¾′ - 153°55⅘′ W. (2) Shearwater Bay, Kodiak Island. From a British survey in 1904. 1:15,000. 57°21.5′ N. and 152°49.5′ W. (3) Southern Part [of] Isanotski Strait, Alaska Peninsula. From a reconnaissance by U. S. Fish Commission. 1:40,000. 54°49′ N. and 163°21′ W. (4) Uyak Anchorage, Kodiak Island. From surveys in 1908. 1:20,000. 57°38′ N. and 154°1′ W. (5) Karluk Anchorage, Kodiak Island. From surveys in 1897 and 1908. 1:20,000. 57°35¼′ - 57°33′ N.; 154°32′ - 154°24′ W. (6) Anchorage and Mud Bays, Chignik Bay, Alaska Peninsula. From surveys in 1874 and 1906. 1:40,000. 56°17′ N. and 158°23′ W. Chart No. 8822. April 1912. 50 cts.

Philippine Islands

Central Part [of] Philippine Islands. [Mercator's projection: equatorial scale 1:800,000.] 15°0′ - 10°12′ N.; 119°0′ - 126°20′ E. Chart No. 4706. Feb. 1912. 50 cts.

Iloilo Strait and Harbor, Southeast Coast of Panay. 1:50,000. 10°49.7′ - 10°33.9′ N.; 122°26.7′ - 122°48.3′ E. With two insets: (1) Iloilo River. 1:10,000. 10°42.0′ N. and 122°34.5′ E. (2) Santa Ana Bay, West Coast of Guimaras. 10°32.5′ N. and 122°31.5′ E. Chart No. 4448. Feb. 1912. 30 cts.

Harbors in Illana Bay and Vicinity, South Coast of Mindanao. (1) Port Sibulan. Surveyed in 1908. 1:60,000. 7°33′ - 7°14′ N.; 122°47′ - 123°0′ E. (2) Port Baras. Surveyed in 1906. 1:20,000. 7°38′ N. and 124°1′ W. (3) Limbug Cove. Surveyed in 1909. 1:15,000. 7°28′ N. and 123°24′ E. (4) Port Sambulauan. Surveyed in 1909. 1:30,000. 7°35¼′ - 7°31′ N.; 123°19¾′ - 123°26′ E. (5) Pagadian Bay. Surveyed in 1909. 1:50,000. 7°49⅖′ - 7°43′ N.; 123°21⅖′ - 123°33′ E. (6) Maligay Bay. Surveyed in 1909. 1:50,000. 7°33′ - 7°26⅖′ N.; 123°9½′ - 123°20′ E. Chart No. 4652. April 1912. 30 cts.

U. S. GEOLOGICAL SURVEY

Maps Accompanying Publications

WYOMING. (a) Map Showing Location of the Potash-Bearing Rocks of the Leucite Hills, Sweetwater County, Wyoming. [1:257,000.] [42°0′ - 41°30′ N.; 109°22′ - 108°47′ W.]. With inset showing location of main map.

(b) [Nine maps entitled] Map showing the location and topographic relief of (1) Pilot Butte, T. 19 N., R. 106 W. [1:50,000]. [41°42′ N. and 109°13′ W.]. (2) Boars Tusk and Matthews Hill, T. 23 N., R. 104 W. [1:50,000]. [41°58′ N. and 109°5′ W.]. (3) the Badger Teeth, T. 21 N., R. 103 W. [1:42,000]. [41°49′ N. and 109°7′ W.]. (4) Cross and Osborn mesas and their relation to the lava-bowlder locality. [1:55,000]. [41°50′ N. and 109°4′ W.]. (5) Hatcher, Emmons and Zirkel mesas, Tps. 21 and 22 N., R. 102 W. [1:70,000]. [41°49′ N. and 108°55′ W.]. (6) Orenda Mesa, T. 22 N., R. 101 W. [1:50,000]. [41°52′ N. and 108°52′ W.]. (7) Black Rock Mesa, T. 22 N., R. 101 W. [1:42,000]. [41°53′ N. and 108°48′ W.]. (8) Steamboat Mountain, T. 23 N., R. 102 W. [1:50,000]. [41°59′ N. and 108°57′ W.]. (9) North Table and South Table mesas, Table Mountain, Iddings, Weed, and Hallock buttes, Endlich and Hague hills, and their associated dikes. [1:55,000]. [41°54′ N. and 109°0′ W.].

Pl. I and Figs. 1-9, "Potash-Bearing Rocks of the Leucite Hills, Sweetwater County, Wyoming" by A. R. Schultz and W. Cross, *Bull.* 512, 1912.

NORTH AMERICA

United States

New York City. [Four maps of the boroughs of New York City, 1:33,600.] (1) Williams' Map of Boroughs of Manhattan and the Bronx. 7 colors. (2) —— of Borough of Brooklyn. 7 colors. (3) —— of Borough of Queens. 6 colors. (4) —— of Borough of Richmond. 6 colors. Williams Map and Guide Co., 218 Fulton St., New York, 1911. Price of pocket edition: maps (1), (2), and (4), 25 cts. each, map (3), 50 cts.

[Wax-engraved city maps of the usual type produced by commercial map-engravers, showing streets, railroad, street car and subway lines, etc. As usual in maps of this type built-up areas are not shown, nor is distinction made between existing and non-existing streets—the feature specially commending the map of New York City, reviewed in the *Bull.*, Vol. 43, 1911, pp. 795-796. What a city map should be can be seen by referring, for instance, to the map of St. Petersburg listed below under "Russia," or to the countless excellent city maps in Baedeker's guide books.]

Canada

Canada, Etc. (a) Canada: Map Showing Accumulated Temperatures (Degrees C.) between the Times when the Mean Monthly Temperature Curve Rises above 5° C. in Spring and Falls to 10° C. in Autumn. 1:20,000,000. 75° - 40° N.; 150° - 50° W. 1 color.

(b) Canada: Map Showing the Area within which the Temperatures are Sufficient for Wheat Cultivation. Same scale and approximately same coordinates as map (a).

Accompany "Climatic Limits of Wheat Cultivation, with Special Reference to North America" (first part) by J. F. Unstead, *Geogr. Journ.*, Vol. 39, No. 4, 1912, pp. 347-366.

[Map (a) gives equal temperature lines showing the total amount of heat available for wheat growing; map (b) shows the polar limit of possible wheat growing and indicates the excess or deficit of the accumulated temperatures as compared with those required for wheat cultivation. Map (b) shows, for instance, that, aside from the valley of the Peace River almost as far up as its issue from the Rocky Mountains, the valley of the Liard for 150 miles above, and the valley of the Mackenzie for 150 miles below Fort Simpson are still within the limits of successful wheat cultivation.

The paper on which the maps are based is exemplary in its geographic treatment of the topic.]

AFRICA

Angola. Esboço da Carta de Angola. 2a Edição. 1910. 1:2,500,000. 4° - 19° S.; 10°40′ - 25°26′ E. 4 colors. In 2 sheets. Commissão de Cartographia (Lisbon), 1910.

[Valuable general map on relatively large scale. Representation of relief primitive.]

Kamerun. Die Neugestaltung Kameruns auf Grund des Marokko-Abkommens. 1:2,500,000. 13° N. - 6° S.; 6° - 22° E. 10 colors. Dietrich Reimer (Ernst Vohsen), Berlin, 1911.

[Wall map with political coloring. Boundaries of territories of the French exploiting companies shown.]

Kamerun. (a) Die Stromgebiete des Mungo, Wuri und Dibamba. 1:500,000. 5°19′ - 3°30′ N.; 8°46′ - 10°55′ E. 4 colors.

(b) Das Manenguba-Gebirge. Nach den Aufnahmen von Stabsarzt Berké, Dr. Esch, Hptm. Glauning, Prof. Dr. Hassert, Oberlt. Hirtler, Oberrichter Dr. Meyer, Oberlt. Rausch, Oberlt. Schlosser und dem gesamten vorhandenen Material bearbeitet von E. Lober unter Leitung von Max Moisel. 1:100,000. 5°7.5′ - 4°56.7′ N.; 9°46.3′ - 9°57.2′ E. 2 colors.

Karten 8 and 9, respectively, "Das Manenguba-Hochland: Ein Beitrag zur Landeskunde Kameruns" by F. Thorbecke, *Mitt. aus den Deutschen Schutzgebieten*, Vol. 24, No. 5, 1911, pp. 279-310.

[Maps of the usual excellence of German colonial maps. Relief in approxi-

XUM

mate contours and shading in brown. On map (a), which is an extract from Moisel and Sprigade's "Grosser Deutscher Kolonialatlas," boundaries of districts inhabited by native tribes are shown.]

MOROCCO. Höhenschichtenkarte des Atlasvorlandes von Marokko. Entworfen von Dr. Rudolf Zietz. 1:2,250,000. 36° - 31° N.; 10°0′ - 4°25′ W. 5 colors. Accompanies, as Taf. 48, note with same title by same author, *Pet. Mitt.*, Vol. 58, I, May, 1912, pp. 270-271.

[Valuable hypsometric map of the Atlantic coastal plain and piedmont region of Morocco. The choice of contours at an interval of 250 meters is better suited, the author says, to bring out the scarp fronts bounding the coastal plain and the piedmont region on their inner sides, which lie, respectively, at an elevation of 250 and of 750 meters, than the only existing hypsometric map of the region, that by R. de Flotte Roquevaire, with contours at 200, 500, and 1,000 meters.]

MOROCCO. [Four maps entitled:] Morocco to illustrate the paper by Alan G. Ogilvie. 1:7,500,000. 36¾° - 30° N. 10° W. - 0°. I. Geomorphology. 6 colors. II. Relief. Contours based upon particulars given in the map of Morocco in V. de St. Martin & Schrader's Atlas Universel de Géographie. III. Rainfall. After Th. Fischer (West of Atlas) and Bernard (East of Atlas). IV. a. Population (After Bernard's map compiled from estimates of Larras). b. Railways Suggested (mainly by Bernard). Accompany "Morocco and its Future" by A. G. Ogilvie, *Geogr. Journ.*, Vol. 39, No. 6, 1912, pp. 554-575.

[Cartographic epitome of the subject-matter of the excellent systematic regional treatment of Morocco which they illustrate. A more contrasting color scheme, especially in the case of map I, would have been preferable.]

ASIA

CHINESE EMPIRE. Sketch Map showing F. Kingdon Ward's Route through the Lutzu Country to Menkong. 1:500,000. 28°30′ - 27°57′ N.; 98°20′ - 98°55′ E. With inset, 1:30,000,000, showing location of main map. Accompanies, on p. 585, "Through the Lutzu Country to Menkong" by F. K. Ward, *Geogr. Journ.*, Vol. 39, No. 6, 1912, pp. 582-592.

[Additional contribution to our increasing knowledge of the constricted upper courses of the Salween and Mekong Rivers. Relief in wash, reproduced by half-tone process.]

CHINESE EMPIRE. Sketch map to illustrate the paper on Exploration in Mongolia and Dzungaria by Douglas Carruthers. 1:7,500,000. 58° - 39° N.; 70° - 112° E. 2 colors. Accompanies "Exploration in North-West Mongolia and Dzungaria" by D. Carruthers, *Geogr. Journ.*, Vol. 39, No. 6, 1912, pp. 521-554.

DUTCH EAST INDIES. (a) Zuidoostgedeelte van Soemba, Kleine Soenda-Eilanden. Sept. 1911. 1:100,000. 9°50′ - 10°25′ S.; 120° - 121° E. With three insets: (1) Watoe Liboe, Zuidkust Soemba. 1:20,000. [10°15′ S. and 120°35′ E.]. (2) Reede Benda, Zuidkust Soemba. 1:20,000. [10°12′ S. and 120°44′ E.]. (3) Reede Melolo, Noordoostkust Soemba. 1:20,000. [9°53′ S. and 120°41′ E.].

(b) Westkust Sumatra, Singkel tot Sibolga. 1:100,000. 2°18′ - 1°40′ N.; 97°40′ - 98°47′ E.

Charts Nos. 303 and 77, published by the Ministerie van Marine: Afdeeling Hydrographie, The Hague, 1911.

AUSTRALASIA AND OCEANIA

VICTORIA. (a) [Sketch map of the Yarra River and Dandenong Creek Basins, compiled chiefly from the county map of Evelyn]. [1:506,880]. [37°33′ - 38°0′ S.; 144°59′ - 145°33′ E.].

(b) [Outline of portion of the Yarra River east of Templestowe, showing the present and initial courses of the river, since the uplift of the Nillumbik Peneplain]. [1:120,000]. [37°41′ - 37°47′ S.; 145°7′ - 145°20′ E.].

(c) [Plan and section of the Yering Gorge]. [1:31,680]. [37°43′ S. and 145°20′ E.].

(d) [Geological map of the Yarra and Upper Goulburn Basins, taken from

the geological map of Victoria, published in 1909 by the Mines Department]. [1:1,700,000]. [36°45′ - 38°5′ S.; 144°53′ - 146°40′ E.].

Accompany, as Pls. LXXXVI (incorrectly numbered Pl. LXXXVIII), LXXXVII, LXXXVIII (incorrectly numbered LXXXVI) and LXXXIX, "A Contribution to the Physiography of the Yarra River and Dandenong Creek Basins, Victoria" by J. T. Jutson, *Proc. Roy. Soc. of Victoria,* Vol. 23 (N. S.), Part II, 1911, pp. 469-515.

VICTORIA. (a) [Sketch map of the whole or parts of the Parishes of Nillumbik, Sutton, Warrandyte, Ringwood, Bulleen and Nunawading, compiled chiefly from the parish maps]. [1:170,000]. [37°39′ - 37°53′ S.; 145°7′ - 145°18′ E.].

(b) [Enlarged map of the Warrandyte goldfield]. [1:55,000]. [37°44′ S. and 145°14′ E.].

Pls. XCI and XCII, "The Structure and General Geology of the Warrandyte Goldfield and Adjacent Country" by J. T. Jutson, *Proc. Roy. Soc. of Victoria,* Vol. 23 (N. S.), Part II, 1911, pp. 516-545.

EUROPE

BELGIUM. Carte des Chemins de Fer, Routes, & Voies Navigables de la Belgique. 1911. 1:320,000. 51°30′ - 49°30′ N.; 2°30′ - 6°5′ E. 5 colors. Institut Cartographique Militaire (Brussels) 1911.

[Official railway map of Belgium. Areal tint to distinguish provinces.]

BELGIUM. Tableau d'Assemblage des Cartes de la Belgique avec liste alphabétique des noms des communes. 1:800,000. Institut Cartographique Militaire (Brussels), Feb. 1, 1912.

[Index map of the four standard topographic maps of Belgium on the scales, respectively, of 1:160,000, 1:100,000, 1:40,000 and 1:20,000.]

GERMANY. (a) Übersichtskarte des Eiderseengebiets. 1:200,000. 54°31′ - 54°4′ N.; 27°5′ - 27°55′ E. 5 colors.

(b) [Ten maps of individual lakes entitled:] Die Seen des Eidergebietes. Von Dr. G. Wegemann. 1:25,000. 6-19 colors. Location indicated on map (a). (1) Einfelder See. (2) Wittensee. (3) Ober-Eider See. (4) Borgstedterenge. Schirnauer See. (5) Audorfersee. (6) Westensee und Umgebung. (7) Flemhuder See. (8) Bistensee. (9) Brahm-, Warder-, Pohl-, Lust-See (Nortorfer Seen). (10) Borgdorfer See.

Taf. 37 and 38, "Die Seen des Eidergebiets" by G. Wegemann, *Pet. Mitt.,* Vol. 58, April, 1912, pp. 197-201.

[Map (a) shows districts without outlet, districts draining both towards the Eider and towards the Elbe and the divide of the Eider basin. The ten insets listed under (b) have brown altitude tints on land and blue depth tints to show the shape of the lake basins.]

GERMANY. (a) Verlauf der Endmoränen zwischen Storchnest und der Oder. 1:500,000. [52°0′ - 51°45′ N.; 15°42′ - 16°50′ E.].

(b) Verlauf der Lissaer Endmoräne von Dolzig bis zur russischen Grenze. 1:500,000. [52°15′ - 51°55′ N.; 17°0′ - 17°45′ E.].

Accompany, on pp. 62 and 69, respectively, "Über den Verlauf der Endmoränen bei Lissa (Prov. Posen) zwischen Oder und russischer Grenze" by J. Behr and O. Tietze., *Jahrb. der Kgl. Preuss. Geol. Landesanstalt,* Vol. 32, Part I, No. 1, 1911, pp. 60-75.

GERMANY. (a) Das Glimmerschiefergebiet von Ruhla. 1:25,000. [50°55′ N. and 10°23′ E.].

(b) Das Glimmerschiefergebiet von Brotterode. 1:25,000. [50°48′ N. and 10°28′ E.].

Taf. 2 and 3, "Über die Amphibolite des nordwestlichen Thüringer Waldes" by T. Lange, *Jahrb. der Kgl. Preuss. Geol. Landesanstalt,* Vol. 32, Part I, No. 1, 1911, pp. 1-52.

RUSSIA. Plan of St. Petersburg. [In Russian.] [1:19,320]. 6 colors. A. Ilyin, Cartographical Establishment, St. Petersburg, [1911].

[Excellent plan of St. Petersburg showing built-up areas (public buildings differentiated), parks, fields, and street car lines.]

XUM

SWITZERLAND. H. Kümmerly: Spezialkarte des Zürichsees mit Umgebung [in Reliefbearbeitung]. 1:50,000. [47°23′-47°8′ N.; 8°27′-8°58′ E.]. 4 colors. Geographischer Kartenverlag Bern: Kümmerly & Frey u. A. Francke. frs. 3.

[Excellent map with the superb plastic treatment of relief characteristic of the Swiss school of cartography, of which the publishers of the above map are the best exponents. Their chef d'œuvre is the official school wall map of Switzerland, 1:200,000.]

WORLD AND LARGER PARTS

MEDITERRANEAN REGION AND NEAR EAST. Philips' Map of Tripoli, Morocco and the Near East. [1:6,500,000]. 53°-21½° N.; 16° W.-40° E. 10 colors. With two insets: (1) The Dardanelles. [1:600,000]. (2) Morocco. [1:6,500,000]. 36½°-28° N.; 11° W.-1½° E. 3 colors. George Philip & Son, Ltd., London. Price 1/-.

[Usual type of map with political coloring.]

WORLD. (a) Kartenskizze der Kontinentalschollen. [Mercator's projection: equatorial scale 1:250,000,000.]

(b) Verbreitung der abyssischen Sedimente (nach Krümmel). [Two hemispheres, 1:220,000,000.]

On Taf. 36, "Die Entstehung der Kontinente" (first part) by A. Wegener, *Pet. Mitt.*, Vol. 58, I, April, 1912, pp. 185-195.

POLAR

GREENLAND. (a) Sketch map of the area investigated [for plankton during the "Danmark-Expedition" of 1906-1908]. [1:5,000,000]. 78°30′-74°35′ N.; 24°30′-5°30′ W. Accompanies, on p. 335, "Marine Plankton from the East Greenland Sea: [Part] IV" by C. H. Ostenfeld and O. Paulsen, *Meddelelser om Grønland*, Vol. 43, 1911, pp. 318-326.

GREENLAND. Sketch-map of the east coast of N. E. Greenland between 80° and 81° N. L. showing the position and extension of the Carboniferous rocks. [1:2,300,000]. 81°-80° N.; 20°-12° W. Accompanies, as Fig. 1, on p. 339, "Contributions to the Carboniferous Flora of North-Eastern Greenland" by A. G. Nathorst, *Meddelelser om Grønland*, Vol. 43, 1911, pp. 339-346.

EDUCATIONAL

EUROPE. Philips' Comparative Series of Wall Atlases: Europe. Edited by J. F. Unstead, M.A., & E. G. R. Taylor, B.Sc. With explanatory handbook to teachers. George Philip & Son, Ltd., London, 1912. 21s. [Eight maps, 1:6,000,000, entitled:] (1) Relief of Land and Communications. 13 colors. (2) Political Divisions. 9 colors. (3) Climate: Summer Conditions. 8 colors. (4) Climate: Winter Conditions. 9 colors. (5) Temperature. 12 colors. (6) Natural Vegetation. 9 colors. (7) Economic. 6 colors. (8) Density of Population. 8 colors.

[An admirable series of wall maps both in content and in execution. An epitome, in cartographic form, of all phases of the geography of Europe, critically selected for educational purposes and drawn with the boldness of line essential in a wall map.

On map (1) seven tints, ranging from brown to green, are used to express elevation on land and three blue tints for the depth of the sea. Maps (3) and (4) show rainfall (six degrees) and prevailing winds for the six summer and for the six winter months (Nov. to April), respectively, as well as July and January isobars. Map (5) shows January and July isotherms on a relief map. Map (6) distinguishes between (a) ice desert, tundra and alpine flora, (b) coniferous forest, (c) broad-leaved forest and meadow, (d) evergreen trees and shrubs, (e) temperate grass lands, (f) semi-desert, (g) desert, (h) oases. Map (7) distinguishes between (a) industrial districts, (b) agricultural and (c) non-productive regions and indicates by symbols the principal workings of coal and iron and the location of the principal agricultural products. Map (8) distinguishes between seven densities of population and indicates all towns having a population over 100,000.

This wall atlas is the first of a series in preparation which will include the five other continental divisions.]

XUM